Electric Railway Journal

A CONSOLIDATION OF STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

Vol. XXXIX NEW YORK, SATURDAY, FEBRUARY 3, 1912 No. 5

PUBLISHED WEEKLY BY

McGraw Publishing Company

JAMES H. McGRAW, Pres. C. E. WHITTLESEY, Sec'y and Treas.

239 West 39th Street, New York

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Wednesday, 9 a. m., of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8000 *copies are printed.*

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COMMITTEE WORK

The meetings of committees held in connection with the midyear conference of the American Electric Railway Association in New York last week direct attention to a feature of the work of this national organization which is extremely helpful to the industry served. We do not know of any national association that is of as much importance as the American Electric Railway Association which has perfected organization by committee and given publicity regarding the transactions of committees as successfully as this one. Each of the associations has developed its committees more and more as time has passed. In addition to that, the Engineering, the Accountants' and the Transportation & Traffic Associations have joint committees representing two associations for the purpose of giving the best attention to topics that concern both. It has now been decided that in the consideration of the subject of fares the Accountants' Association shall appoint a committee to make an investigation in conjunction with the inquiry of the new sub-committee appointed in the American Association for this purpose. Therefore, four associations out of the entire group of the American and affiliated organizations will have intimate working relations on various subjects, and the co-operation should be most effective.

SETTLING THE SUBWAY QUESTION

Macaulay has provided us with a sketch of the condition of affairs some 2000 years from now when the present civilization shall have passed away and the predominant power, instead of being in Europe and America, has traveled westward to the Far East, and he has pictured a New Zealander contemplating the ancient ruins of London and speculating upon the life and people which existed there during the nineteenth century. Should this traveler continue his journey across the Atlantic to New York, we hope that he will find some traces in that city of an extension to the present subway system. Even before the present subway was completed, and ever since, extensions have been advocated by the company, by the city authorities, by the commissions in charge of the work and by influential groups of citizens, in fact by everybody who has been interested. Nevertheless, the negotiations continue, as if the interests of the city were not continually suffering by the delay. On many occasions an agreement has almost been reached, but a belated fear on the part of some one of the many gentlemen who have acted as custodians of the interests of the city has made a halt necessary. Each year of delay—we might almost say each month of delay—has probably cost the city and its citizens more in the way of postponed development than the sum total of the concessions asked, not to speak of the discomfort to passengers caused by the present overcongested condition of the existing system. It may be that those who are conducting the negotiations for the company are asking a good price as a recompense for the pooling and division of the profits of the present and proposed systems, which now seems to be the plan under debate. But, on their side, the representatives of the city should weigh these questions, not against the fractional

additional percentage which they might like to secure, but against the vastly larger sum which the city will undoubtedly gain by a prompt settlement of this question.

SPRINKLER SYSTEMS IN WINTER

The severe winter should direct the thoughts of electric railway managers to temperature conditions in carhouses which are equipped with sprinklers. It is customary to use the wet-pipe system in the non-operating sections of carhouses upon the assumption that the freezing point will not be reached if the heating equipment is in service. Recently at one of the carhouses of a large Eastern company the way engineer in making a casual inspection found that the sprinkler piping was frozen and therefore was worse than useless, because of some employee's negligence in keeping the doors open too long. Even the dry-pipe system requires some degree of vigilance, and the pumproom equipment and gravity tank piping, in particular, should be examined at frequent intervals during the cold-weather period. As a matter of fact, there is no time of the year when the maintenance of the sprinklers can be slighted with impunity. No excuse can be offered for permitting any of the hundreds of sprinkler heads to become incrusted with dirt or the piping to remain unpainted until it seems ready to collapse from oxidation. It would not be a bad plan, indeed, to subject groups of sprinklers to service trials at occasional intervals. Such tests would not only demonstrate the actual efficiency of the individual sprinkler heads, but they would also show whether the water pressure was being maintained.

REVISION OF ASSOCIATION MEMBERSHIP

To many the announcement in regard to a revised system of membership in the American Electric Railway Association made by President McCarter in his banquet speech last week was the first intimation that any such plan was under consideration. Nevertheless, the matter is one which has been carefully considered for a long time by the executive committee and other friends of the association. The proposed system is very wide in its scope and should greatly help to increase the size of the association and its ability to undertake the solution of the many problems which are presented to it. Briefly, the changes which have been decided upon may be grouped under three headings: a revision of the membership classification, company sections, and publicity.

The most important feature of the proposed revision of membership is the abolition of the former grade of associate membership. Hereafter any individual who is or has been at some time actively identified with electric railway interests, or who, in the opinion of the executive committee, has had experience of such a nature as to render desirable his connection with the association, is eligible as a full member of the association. Formerly these were the qualifications necessary for an associate member, and the grade of member was reserved for operating companies. But to many persons, particularly to engineers, the term "associate" was distasteful, because in all of the engineering societies this word is used to designate an inferior grade of members. Representatives of the associate membership committee of the association frequently were handicapped by this fact. Now this objection has been removed and there is no bar to anyone, whether a railway man, a manufacturer or a manufacturer's representative, provided his name is acceptable to the association, becoming a full member. Electric railway companies which are members of the association will be known as company members, and those by whom they are represented at the convention will be known as delegates. The new arrangement, also, involves a plan by which every manufacturer's representative who attends the convention becomes a member of the American Electric Railway Association and, concurrently, has permission to attend any of the meetings. It is believed by this means that the advantages of the grade of associate membership—now membership—of the association will be so increased as to attract a very large number of people.

With this change will come the establishment of company sections among the member companies. The general principles of the company-section idea have become so well understood through the practice of the National Electric Light Association and through the discussion in these columns whether the same plan should be adopted by the American Electric Railway Association that no extended explanation of the plan is necessary here. It is sufficient to say that the proposal has been received with enthusiasm, especially by those railway companies which are also members of the National Electric Light Association and consequently have experienced the advantages of the plan in connection with their lighting work. Many officials of these companies believe the merits of company sections in railway work to be even more conspicuous than with lighting companies, and undoubtedly a number of these company sections will soon be formed.

Finally, the association contemplates the abandonment of all executive meetings. Everything in the future will be open, and the association will allow and encourage full publicity of its affairs. Practically, there has never been any reason for any other policy. During the past few years there have been a few meetings of the parent association at each convention which were termed executive, but this simply meant that the executive committee reserved the right to withhold from publication any of the addresses made there and that the speakers at the meeting had the same right so far as their own remarks were concerned. This privilege, however, has rarely been exercised, and the papers and addresses presented at executive meetings have been given to the press practically as freely as those at open meetings. In addition, however, the association now contemplates the publication of a monthly bulletin which will be sent to all members and will keep them fully informed of the work of the association. This plan has been followed by the National Electric Light Association for a number of years with satisfactory results. As in the case of that association, the bulletin will not attempt in any way to duplicate the field now occupied by outside publications or by the present printed matter of the association, and will not contain advertising. It is thought, however, that by this means those who are some distance away and are brought into touch with the activities of the association only at its stated meetings will be better able to keep informed of what is being done by the organization.

PAYING THE UNION DUES

Many plans have been suggested for dealing with labor unions on electric railway properties, but none, we believe, has been so radical as that suggested last August by the Philadelphia Rapid Transit Company. Its proposition was not only to recognize the strongest union on its system, if any one union should be indorsed by two-thirds of its employees, but to pay into the treasury of that union the dues of every employee on its system. In this way every trainman would not only become a member when he accepted employment, but would be in good standing as long as he remained with the company.

Such a plan, at least when considered theoretically, should be a consummation of the highest hopes of a labor leader. His experience has usually been that the regular demand of a dollar or so a month as dues to the union too often has acted as a damper upon the enthusiasm of the union member, especially of the man who never sympathized particularly with the purposes of the union and had joined only because of pressure brought upon him by his fellow-workmen. If the children at home needed shoes, or if there had been sickness in the family, considerable argument had often to be used before the dollar was forthcoming. All this trouble was now to disappear. The dues would be collected before the men received their wages and would be turned over as a lump sum to the chosen union leader. Evidently the millennium had arrived, because with 7000 or so employees on the Philadelphia Rapid Transit Company some $84,000 a year seemed within easy reach.

But the result from a given number of predicates cannot always be foreseen. In fact, as events turned out, it seems almost as if the plan, instead of being intended for harmony, had been suggested by the historic incident of the golden apple inscribed "To the most beautiful" which was thrown into a group of three lovely women on Mount Ida many years ago, or as if some of the directors of the company had recently been reading the essays on diplomacy written by an Italian gentleman by the name of Machiavelli. At any rate, the sequel of the contest for this prize has not been the hoped-for combination of the two unions which then divided the employees of the company. Instead, as described in an article elsewhere in this issue, the number of unions has increased to three, none of which as yet possesses anywhere near the number of adherents necessary to constitute the two-thirds majority required. At the time when the plan was proposed it looked as if the harvest might be garnered by one particular union, but the national officials of that union did not consider that the local leader should be intrusted with such a responsibility, and he was removed. Many of his loyal adherents followed him, and they also were expelled. The outcome is more uncertain now than at any other time.

It is almost needless for us, in commenting on this situation, to say that we do not consider the example of the Philadelphia Rapid Transit Company a safe one to follow. We are not opposed to unions as such. But until a union has established a reputation for meeting employers upon a reasonable basis, until it has ceased to intimidate those employees who do not wish to join the union, and until it can furnish a financial or equally strong guarantee that it will live up to its contracts or pay adequate damages for their infraction, a union is not a good thing for either a company or its employees. A contract under which one of the parties can be held accountable to the agreement and the other is free to break it on any occasion is worthless to the responsible party, and unless a union is in the position to make a contract of this kind there is no excuse for its existence.

IMPROVEMENTS IN MOTOR DESIGN

We do not remember for a long time as much interest in the subject of electric railway motor design as at present. The electric motor seems to be on the threshold of as valuable a series of improvements as those which affected the car body after the development of the prepayment idea. Up to that time there had been few, if any, radical changes in the general principles of car-body design for many years. In the same way electric motor design, viewed from a broad standpoint, has changed but little—or had changed but little up to recently—since the development of the series-parallel controller, twenty years ago, brought about the well-known straight series motor. It is true that during this interval many details in motor design have been perfected. The parts have been made more accessible; methods of lubrication have been bettered, and motors have been increased in efficiency and durability. Special motors have also been designed for particular classes of work, but it was not until the introduction of the interpole principle in motors for city service that still further improvements in motor design became possible—or perhaps we should say became apparent.

So long as designers were handicapped by the necessity of subordinating every other detail in motor design to the preservation of the line of commutation by the old methods, but little improvement could be expected. But by the simple expedient of inserting auxiliary poles between the main field poles the line of commutation was reduced from a variable to a fixed position, and the engineer had free scope to redesign other parts of the motor which hitherto he had not dared to change.

It is true that the interpole idea has not been directly responsible for all of the ideas now being advanced for improvement in electric motor design. Some of them could have been introduced probably long ago in motors of the old type. But this is the history of every advance in an art. Things continue along for a number of years without radical change until some important improvement is made. This leads to or suggests another, perhaps having no relation to the first, and in a short time a revolution in the industry or the art has been effected. We would be unjust to the facts, however, if we should omit to refer to one other influence, besides the use of interpoles, which has undoubtedly been to a large extent responsible for the recent improvements of motor design. This has been the widespread effort to reduce car weights, directed first to the car body, then to the motors and finally to other parts of the equipment. In fact, the reduction in the weight of the entire car has been really the goal toward which all of the efforts at motor improvement have been directed.

These improvements may be divided roughly into three classes, all of which mean a smaller and lighter motor. Briefly, they are high speed, better ventilation and better

insulation. To secure a higher-speed motor the plan of weakening the field at high speeds has been revived. Such a method is possible only with an interpole motor, because without such a device the effect of the armature reaction on the shunted field would be disastrous upon the commutating qualities of the motor. To what extent the principle will be applicable in railway service, or, rather, the class of service in which it will be most advantageous, remains yet to be determined. On the one hand, the ability with a two-motor equipment to get four running speeds seems to fit the system particularly to city work. On the other hand, it has been argued that the method of field control is more applicable to motors on interurban cars that have slow-speed city runs of appreciable length.

The high-speed motor introduces other problems, however, than those merely of control. Of these, perhaps the best method of increasing the gear ratio is most important. Can this be done practically with a three-pitch gear, or should there be an increase to, say, a 3½-pitch gear, which would make possible on the ordinary city car considerably higher gear ratio? Tests seem to indicate that such a higher gear reduction is practicable from an engineering standpoint. Whether it is commercially desirable remains to be determined. This much is certain, that the efficiency of the motor depends quite as much on the selection of the proper gear ratio as upon almost any part of the equipment. The proper ratio to select depends directly upon the type of motor used and upon the service, and each case should be studied by itself if the most satisfactory results are to be secured. This, however, is another question.

The second direction in which improvements in motor design have been forging is in ventilation. The idea itself is not new. Artificial ventilation of railway motors is almost as old as the electric railway motor itself, but all such prior applications of the principle have been special. It is only within the past few months that any attempt has been made to ventilate a railway motor for city cars with a blower integral with the motor itself. But there seems to be no reason why the principle which has long been applied to transformers and other stationary apparatus should not be equally applicable to railway motors, where the question of weight is far more important.

Finally we reach the question of fireproof insulation in its various forms, such as asbestos, mica and other compositions. Formerly the heat limits of the motor were determined absolutely by the ability of the cotton insulation used to withstand heat. Now the limit seems to be that either of the insulation itself or of the solder which is still used to attach the motor leads to commutator bars; or possibly the limit may be the extent of the effect on the insulation or on the conductor bars themselves of their alternate expansion and contraction. Which of these limits, or possibly of some others which may be developed later, will be the controlling one remains yet to be determined. Certainly motors have been successfully used for some months in some classes of service reaching temperatures of 100 deg. C. above the surrounding atmosphere, a condition which would have been looked upon as incredible a few years ago. The test of time will determine how permanent these improvements will be, or whether even better methods of heat-resisting insulation will be discovered.

THE FRUITS OF ASSOCIATION WORK

The activity and enthusiasm displayed by the members of the many committees who assembled last week at the midyear conference of the American Electric Railway Association recall, by contrast, the old days when the staple product of the annual convention consisted of papers by individuals. There still is and there always will be a place in convention proceedings for recitals of the work of single companies. It is in line with the evolution of all industries, however, that nowadays the big, broad problems of electric railroading in every phase should be handled best only by the groups of specialists which the personnel of properly selected committees embraces. At no previous time have the various elements of the national association been in such close touch with one another or with the industry at large. Such systematic co-ordination of effort was impossible under the old conditions of individual action.

Despite the splendid results which the wide adoption of committee work have forwarded, there are still many railways outside the fold of membership. Some of these assert that the harvest is not worth the sowing, and, as proof, they point to the tardy and merely partial adoption by the member companies of committee recommendations which have been reached after years of investigation. Those who make this criticism ignore the all-important fact that many betterments have been obtained through the labors of the national and sectional associations merely through the wide publicity given to certain questions. Thus, the researches by the equipment committee of the Engineering Association with regard to possible reductions in car weight were doubtless the leading cause for the recent development of the light-weight motor. Had the committee accomplished no more than this, its existence would have been amply justified. Yet there is no question as to the great value of the other information on car design, construction and equipment which it has gathered and disseminated from year to year.

In like manner, the work of the standardization committees has had wide-reaching, beneficial effects. The simple slogan "Standardize" started many companies toward an analysis of their track, line and car equipment with the natural result that they found it possible to reduce the number of their patterns, even when local conditions or local prejudices prevented the adoption of the association standards.

It must be admitted that the wide acceptance of the standard codes of city and interurban rules is far from an accomplished fact; but the nation-wide discussion of this subject has surely led to safer operating methods on more than one road. The great desideratum is to have these codes indorsed by the state railway commissions, after which the companies subject to their jurisdiction will be more likely to fall into line.

In short, in considering the work of any committee, finality should not be expected in so live an industry as electric railroading. The best that can be done is to "catch the manners living as they rise"—to assemble and analyze the latest developments in each important phase of the art to the end that the best practices shall be made available to all.

LIMITATIONS UPON DEVELOPMENT

The paper by Mr. Tripp read at the meeting of the American Electric Railway Association in New York and published in our issue of last week was entitled "Economic Limitations Upon the Development of Transportation by Electric Railways." This is a very broad subject, and there was naturally much interest on the part of members to see what particular aspect of the topic Mr. Tripp would discuss. It proved to be the particular conditions which have operated to make the rate of fare inadequate. The definite conclusion stated by Mr. Tripp was that if taxes, prices and services are not to be reduced there must be a readjustment of the fixed 5-cent fare and universal transfer in order to insure a fair return even on the present investment.

No one can tell how long it will take to make the widespread readjustment of fares that is desired, but it is evident that before the changes can be introduced generally and successfully the public needs to be educated to a realization of the new conditions confronting the companies. It is the business of the companies to undertake this educational work. No one will do it for them, and if they fail to do it for themselves they will find that the politicians will have taken advantage of the opportunity to teach the public that lower fares should be established. But until higher fares or restricted transfer privileges can be introduced one preliminary step toward relief which the companies can take is to show the public that taxes imposed upon public utility properties merely increase the cost of the service to the riders and hence reduce the amount available for each unit of fare. It is more difficult for the street railways to conduct a successful campaign against high taxes than for other public utilities, such as electrical and gas properties, to do so. Those companies render bills to all of their consumers, and it has been suggested by one prominent man in the electrical industry that the facts regarding taxes be presented through this medium. For instance, an electrical or gas company could show on the face of the bill that of, say, $1 received 10 cents was applied directly to taxes, leaving 90 cents as the net price for the service.

While the street railway unit of fare is so very small that the deduction of the proportionate taxes included in each 5-cent piece is too slight an amount to impress the average rider, the percentage rate could be substituted effectively. It could be explained by advertisement on transfers and otherwise that of each fare, say, 10 per cent was collected by the company as a tax to be turned over to the city authorities. Even this, however, would not represent the full expenditures by street railway companies which are in the nature of public benefits and amount practically to a tax upon riders in order that the general revenues of the city may be made available for other purposes.

No other class of public utility is required to do so much for the public as the street railway. In the expenditures for paving, sweeping, snow removal, free transportation of city employees and officials, etc., the street railway company provides a service to the public the cost of which must be met by the riders. If these facts were understood, they should help to lessen excessive taxation. It is argued by some observers of these matters that the public likes better the form of indirect taxation by which it furnishes revenue to the municipality through its expenditure for street railway, electric lighting and gas service, but we do not believe that this is so where the facts are understood clearly. Taxes are levied in a most inequitable manner in nearly all parts of this country, and the policy which taxes the public utility companies in excessive degree in order to furnish revenue in an indirect way is one of the aggravated forms of this inequity which should be corrected.

Even if the companies succeed through a preliminary period of education in effecting a reduction or a substantial elimination of taxes, it is apparent that other methods of relief should be considered. If the companies are to undertake seriously new methods of revenue producing, it is time for them to begin. Mr. Tripp directed attention to the fact that the zone system and a charge for a transfer are both sources of relief that have been tried to only a very limited extent in this country. More experiments should be made.

Two of those who discussed Mr. Tripp's paper considered the problem from entirely different aspects. Mr. Strauss regarded the question from the standpoint of the banker, while Professor Jackson considered the problem from that of the engineer. Mr. Strauss referred to several of the principal points made in the report of the Railroad Securities Commission, of which he was a member. He evidently does not oppose the suggestion that stock be issued without par value, recognizing that such a plan offers a feasible way of overcoming existing public and legislative prejudices against the present method. We agree that this plan offers a satisfactory method of recapitalization in the case of reorganizations, although where the reorganizations involve an assessment on capital stock we believe that it would be more difficult to induce shareholders to pay the assessment, particularly if it should be large, than if they received a certificate representing that a definite par value had been assigned for the investment. Of course, it is true, as Mr. Strauss states, that those who advocate limitation of capitalization to cost of replacement do not generally intend to give the companies the benefit of appreciation in property. This is an inconsistency in their position which they sometimes attempt to justify by saying that the enhancement in value is due solely to the increase in population and the business thereby created, all of which, they argue, is a tribute to the progress of the community and not in any way to the enterprise of the railway.

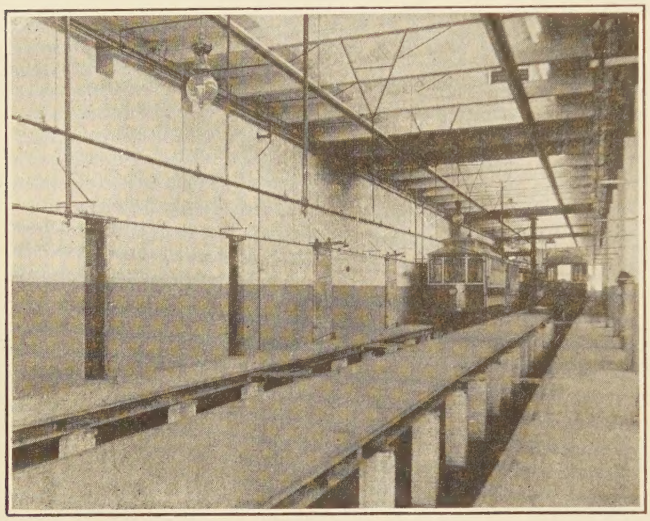
Professor Jackson recommends, as we understand, that careful engineering studies be made of each situation in order that action may be taken with the facts as a basis and not upon the doubtful groundwork of surmises. This is what we have urged insistently. It is, in fact, one of the weaknesses in the theory of the uniform fare which the politicians have been turning to account. The companies should proceed to analyze their operations so as to know what they are giving for a single fare and what they can afford to give if they are to protect their properties permanently against a loss in capital value or a reduction in earnings.

Middletown Carhouse of the Connecticut Company

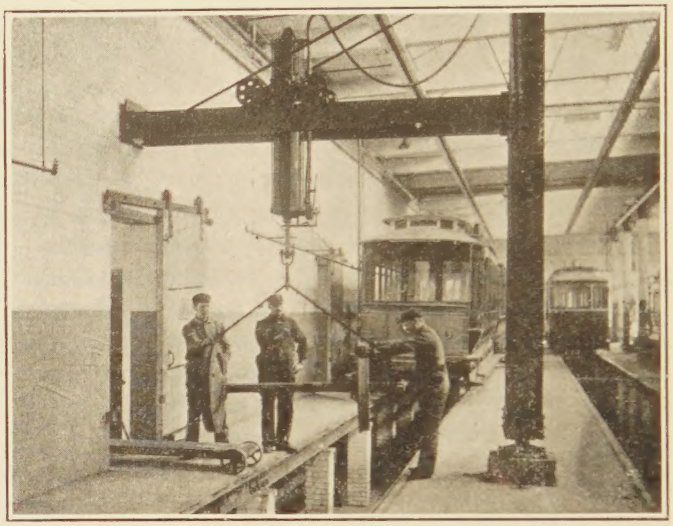
This Article Describes a Combined Carhouse and Shop with the Floor of the Latter Flush with That of the Car Pits

The Connecticut Company has recently placed in operation at Middletown, Conn., an interesting combination of a single-end carhouse and shop for all but the heaviest maintenance.

The Middletown division of the Connecticut company comprises some 33 miles of single track radiating from a common center in a series of approximately equal lines. To the south, east and west are semi-interurban lines; to the north is the Middletown-Hartford interurban, while to the west is also the electrified steam railroad to Berlin and Meriden, which is operated in part by the Connecticut Company and in part by the New York, New Haven & Hartford Railroad. Both companies, however, use the Middletown carhouse. The latter is at the center of the system. There is access to the lot from Main Street on the east, which is the entrance, and to Clinton Avenue on the west. The latter street is much lower than Main Street and has no tracks, so that an entrance on that end would have been unwarrantably expensive.



Middletown Shop and Carhouse—Interior, Showing Pit Construction, Sprinklers, etc.

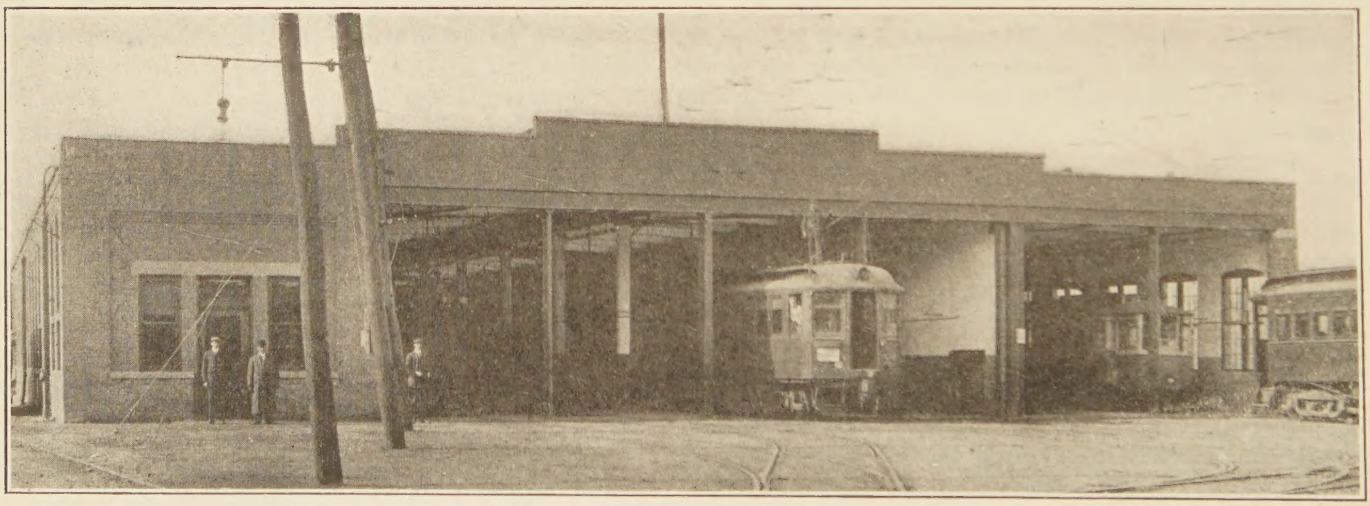


Middletown Carhouse and Shop—Wheel Handling Between Pit and Wheelroom

The entire building occupies an area 341 ft. long, x 102 ft. wide. Of the width 21 ft. is for a shop and general utilities section, 54 ft. for a four-track operating section and 27 ft. for a two-track washroom and paint shop section. The building has concrete footings, brick walls and a mill construction roof framed with 10-in. x 14-in. yellow pine roof girders, 10 ft. center to center. These girders are carried on the side and partition walls and in the center of the four-track section by 15-in., 42-lb. I-beams on reinforced concrete columns 20 ft. center to center. The roof is of slag on a pitch of 5 in. per foot and has tile coping and galvanized-iron cornices. Both sides of the carhouse are furnished with windows and each car bay has skylights.

The main partitions of the building are of 12-in. brick, as are most of the other partitions, although a few are of tile. The paint shop is cut off from the washroom by Kinnear rolling steel doors. The same type of doors is used for the main entrances.

The floors of the shops and pits with the exceptions hereinafter noted are laid on an 8-in. bed of cinders. The floor of the coal storage room is of brick and of the pits



Middletown Carhouse and Shop—General View at Front of the Building

and shops is of concrete 5 in. thick. The platforms or devil strips between the pits are composed of 6-in. I-beams which are bolted to the girder rails at intervals of 5 ft. and carry a 3-in. concrete slab reinforced with expanded metal.

The overhead work is of the Connecticut Company's standard. This consists of an angle iron 2½ in. x 2 in. x ¼ in. on a 12-in. x 2-in. backing board inside, and radial pulls on the entrance curves. The passage of the doorway is made through fixed pans, with a series of fiber insulation strips to break any arc which might tend to pull over to the door.

Both car bays are furnished with open pits for practically their entire length. The running rails, which are Lorain section No. 229, are supported by 12-in. x 12-in. brick piers spaced 10 ft. centers and fitted with cast-iron shoe plates of the type used in the Bridgeport carhouse and shown on page 147 of the Electric Railway Journal for July 22, 1911. The pit adjacent to the shop has removable rails at two places to facilitate the exchange of wheel sets. The pit floors are pitched ½ in. per foot to gutters under the devil strips with suitable sewer connections.

GENERAL ARRANGEMENT OF UTILITIES SECTION

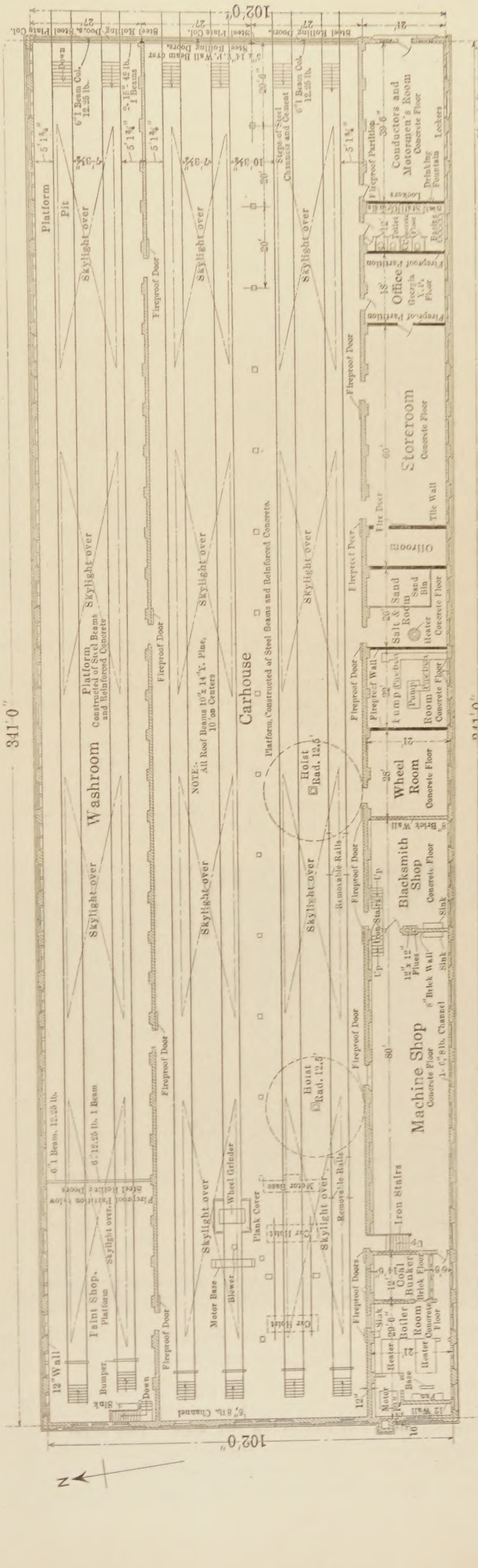
The general arrangement of the office and utilities section is clearly indicated on the plan. The first room to which entrance is obtained is that for the conductors and motormen, where lockers, a drinking fountain and other conveniences are installed. Following this are the toilets, the master mechanic's office, storeroom, oilroom, salt and sand room, pumproom, wheelroom, blacksmith shop, machine shop, coal storage and boiler room.

The storeroom and the salt and sand room open directly into the carhouse proper, the oilroom opening off the storeroom. In view of the small stock of oil carried, no special provisions are made for handling it. The salt and sand room contains a sand bin and a sand-drying stove.

The pumproom, with access only from the outside, will be described in detail in connection with the fire protection. The wheelroom opens on the carhouse main floor and is served by a Q M S air-hoist jib crane of 2½ tons capacity, 11 ft. radius and 5 ft. clear lift, located between the first two tracks in front of the wheelroom door. A second crane of like design bears the same relation to the machine shop door. As shown in one of the accompanying halftone views, a small track is used in connection with the cranes to transfer wheel sets to and from the wheelroom. The necessary compressed air is furnished by an Allis-Chalmers D-4 compressor with a capacity of 150 cu. ft. of free air per minute. The gage and starting switch are mounted on the wall inside the shop, but the compressor itself is placed under the carhouse floor. The wheelroom, which accommodates ten wheel sets, also contains the lockers for the shopmen.

The blacksmith shop has space for additional equipment when needed. At present it contains a Buffalo forge with motor-driven blower and exhauster, a babbitting equipment and an adjustable rack for holding iron stock of various sizes. It has two 12-in x 12-in. flues exhausted through a 16-in. roof ventilator.

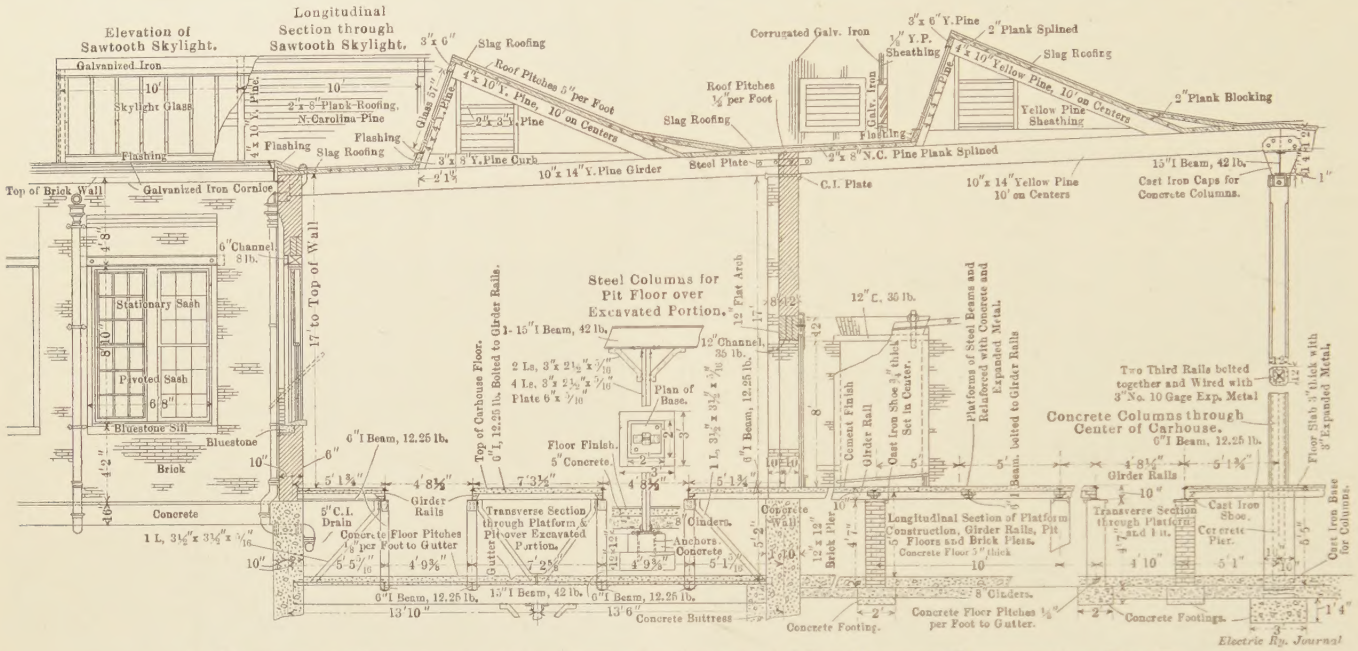
The machine-shop floor is at the level of the carhouse pit floors, 5 ft. below the main floor. This unique arrangement makes it possible to handle equipment between the overhauling tracks and the shop with the least amount of movement. The shop machines are served by a chain hoist traveling on an I-beam track with three branches. The principal tools are: 24-in. Reed engine lathe; Smith & Wallace combination bander, heading and slotting machine; 24-in. Cincinnati shaper; 1½-in. National bolt cutter; Dreses radial drill press; Eureka magazine hack saw; drill grinder; double emery grinder; grindstone and babbitt borer, all driven through countershafting by a 15-hp G.E. motor.



Middletown Carhouse and Shop—General Plan, Showing Also the Location of Skylights

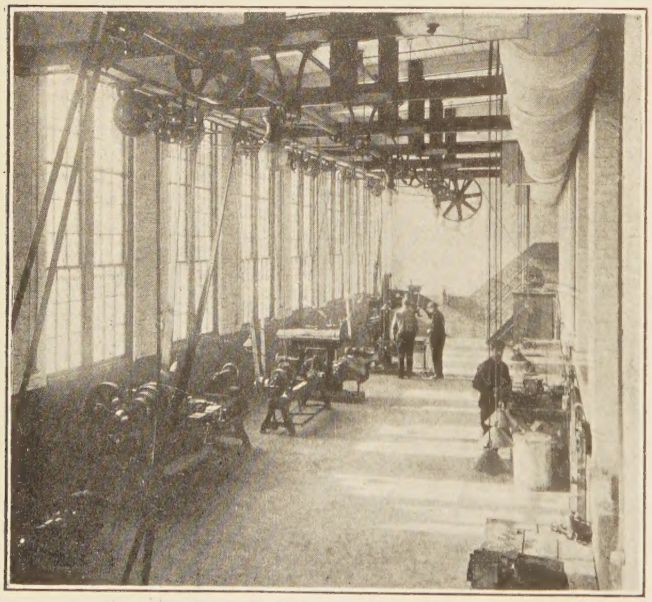
HEATING EQUIPMENT

The heating equipment of the Harrison hot-air type is guaranteed to maintain a temperature, with zero weather outside, of 60 deg. Fahr. in the operating section and 70 deg. elsewhere. The air, which is partly cold from outdoors, partly recirculated from inside, is forced by a 25-hp


Elevation of Sawtooth Skylight.
Longitudinal Section through Sawtooth Skylight.
Galvanized Iron
Skylight Glass
Flashing
Slag Roofing
Roof Pitches ½" per Foot
Yellow Pine, 10' on Centers
Plank Roofing, N. Carolina Pine
Glass 37"
Pine
3"x 6" Y. Pine
2" Plank Splined
Corrugated Galv. Iron
Roof Pitches ¼" per Foot
Galv. Iron
Flashing
Yellow Pine Sheathing
2" Plank Blocking
3"x 8" Y. Pine Curb
10"x 14" Y. Pine Girder
Steel Plate
2"x 8" N.C. Pine Plank Splined
C.I. Plate
10"x 14" Yellow Pine 10' on Centers
15" I Beam, 42 lb.
Cast Iron Caps for Concrete Columns.
Top of Brick Wall
Galvanized Iron Cornice
6" Channel 8 lb.
Stationary Sash
Pivoted Sash
Bluestone Sill
Bluestone
Brick
17' to Top of Wall
Steel Columns for Pit Floor over Excavated Portion.
1-15" I Beam, 42 lb.
2 Ls. 3"x 2½"x 5/16"
4 Ls. 3"x 2½"x 5/16"
Plate 6"x 5/16"
Plan of Base.
12" Channel, 35 lb.
Top of Carhouse Floor.
6" I, 12.25 lb. Bolted to Girder Rails.
Floor Finish.
5" Concrete
6" I Beam, 12.25 lb.
Girder Rails
Transverse Section through Platform & Pit over Excavated Portion.
Cinders.
Anchors
Concrete
Concrete Wall
Brick Pier
Cement Finish
Girder Rail
Cast Iron Shoe ¾" thick Set in Center.
Platforms of Steel Beams and Reinforced with Concrete and Expanded Metal.
Longitudinal Section of Platform Construction, Girder Rails, Pit to Floors and Brick Piers.
Concrete Floor 5" thick
Two Third Rails bolted together and Wired with 3" No. 10 Gage Exp. Metal
Concrete Columns through Center of Carhouse.
Transverse Section through Platform and Pit.
Cast Iron Shoe.
Concrete Pier.
Floor Slab 3" thick with 3" Expanded Metal.
Cast Iron Base for Columns.
5" C.I. Drain
Concrete
1 L, 3½"x 3½"x ½"
Floor Pitches ¼" per Foot to Gutter
Concrete Floor Pitches ¼" per Foot to Gutter.
Concrete Footing.
Concrete Footings.
Concrete Buttress
Electric Ry. Journal

Middletown Carhouse and Shop—Cross-Sections and Miscellaneous Construction Details

motor-driven fan through two banks of heating tubes, each with its own firebox, and thence into a large flue across the rear end of the carhouse and under the main floor, from which the distributing ducts are taken. The office and utilities section have an overhead system with drops at frequent intervals. The rest of the building has ducts under the platforms with frequent damper-controlled side outlets. Where these ducts meet the cross runways to the



Middletown Shop and Carhouse—Shop Section, with Floor on Same Level as Pit Floor

shop they are taken under the pit floor and out again in a long curve. Coal is delivered to the bunkers from the carhouse side, as is shown on the plan. The plant is designed for three complete air changes per hour.

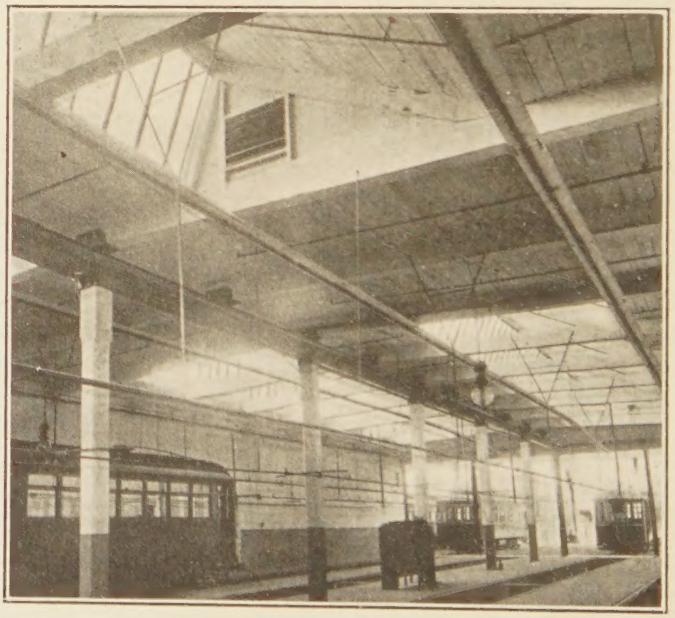
CARHOUSE SECTION

The four-track portion, which is used for overhauling and inspection, contains two Q M S pneumatic pit jacks, a Smith & Wallace beam type pit car hoist, Q M S pitwheel grinder, Columbia portable pinion puller, four armature trucks and the two air hoist jib cranes previously described.

The two-track section has 60 ft. of the rear end assigned for painting. The forward end, from which it is separated by steel rolling doors, is used for washing. Beneath the rear 45 ft. is a basement containing the woodworking tools, as follows: Variety saw bench, buzz planer, band saw, mortiser and foot mitering machine, all furnished by the American Woodworking Machinery Company. A 20-hp G.E. motor drives the power tools through countershafting.

LIGHTING

The lighting circuits are taken off the trolley feeders at



Middletown Shop and Carhouse—Interior, Showing Roof Construction and Sprinklers

550 volts d. c. and are run in iron conduit. The office rooms and the pits are illuminated by 110-volt, 16-cp incandescent lamps, five in series. Elsewhere there are about thirty series arc lamps.

FIRE PROTECTION

The carhouse is provided with very elaborate fire protec-

tion. The Grinnell automatic system consists of ceiling sprinklers everywhere, supplemented by aisle sprinklers at the transom level in all car sections. There are in all 438 ceiling heads and 389 aisle heads. Where temperature conditions warrant the wet pipe method is employed. In the operating section, however, where entrances must of necessity be largely open in all weather, the heads are on dry pipe, all valves being grouped in the pumproom, where an annunciator indicates the location of any opened head. A similar annunciator gives duplicate indication in the office and external gongs serve to call attention to the annunciator.

Water is taken from the city mains and as a precaution against low pressure there is an automatically started electric Underwriters pump of 750-gal.-per-minute capacity, while a 4500-gal. pressure tank furnishes an initial starting head. The pumproom is entered only from the outside, and in an emergency can be operated with a fire raging in the shop and car sections adjacent to it.

In addition to the automatic system a series of standpipes, each with 50 ft. of 1½-in. fire hose, control the entire building.

ENGINEERING

The carhouse was designed by the engineering department of the New York, New Haven & Hartford Railroad and was built under the direction of that company. The lighting was done by the building department of the steam railroad and the track and overhead work by the Middletown forces of the Connecticut company. All other work was done by the contractor, C. W. Murdock, New Haven.

OUTCOME OF THE PHILADELPHIA LABOR PLAN

Railway men have awaited with interest the outcome of the plan announced last August by the Stotesbury management of the Philadelphia Rapid Transit Company to solve its labor troubles by the expedient of paying the union dues of its men. At that time the company had two unions on its system. One was the United Carmen's Association of America. This organization is locally known as the Keystone Union and was loyal to the company during the strike of 1910. The other was the Amalgamated Association of Street and Electric Railway Employees, which conducted the strike of 1910 under the leadership of C. O. Pratt, then chairman of the general executive board of the Amalgamated Association. The proposition of the company to the employees was outlined in a circular submitted to the carmen on Aug. 28, 1911, and was published in the ELECTRIC RAILWAY JOURNAL for Sept. 2, 1911.

In that statement the company said very briefly that the members of these two associations were so antagonistic to each other as seriously to interfere with the operating efficiency of the company. Hence it proposed to deal with only one union in the future and agreed to leave the decision as to which union it should be to the men. It offered to set aside 22 per cent of its gross passenger receipts as a wage fund, and if two-thirds of the men voted in favor of any particular union it would pay into the treasury of that organization out of this 22 per cent wage fund the monthly dues of each motorman and conductor in its employ. At $1 a month (the new Amalgamated membership fee) this would cost the Philadelphia Rapid Transit Company approximately $7,000 a month, or $84,000 a year.

It would not be necessary for any one employee to "join the union"; his dues would be paid by the company whether he joined or not. The question as to how far the company could go in taking out of the wage fund the union dues for all employees was disposed of by this statement: "The desire of two-thirds of the motormen and conductors, expressed by secret ballot, under conditions which insure a fair count, may in all justice be considered as binding on the minority to bear their share of such a tax."

At the time that this suggestion was made the Amalgamated union contained a large majority, perhaps two-thirds, of the employees of the company. Soon afterward, however, it split up into two factions, owing to a disagreement between C. O. Pratt, who had had charge of the affairs of the Amalgamated Association in Philadelphia, and the other members of the general executive board of the association. This altercation led last autumn to the expulsion of Pratt from the union. Some of the employees of the Philadelphia Rapid Transit Company sided with him and others with the national officers, who officially recognize the anti-Pratt faction as a regular body and the holder of the only charter granted in Philadelphia. The Pratt men then set up a separate organization and secured the adherence of the former president of the Philadelphia local and a number of the division committeemen.

Hence when the vote was taken upon the proposition of the company to establish one union three parties among the employees were represented. The Keystone faction voted almost unanimously to accept the plan. The total vote was 4276 in favor of the scheme and 2366 against it, the dissenters representing the ultra-radicals among the Amalgamated men. As the proposition failed to carry by the necessary two-thirds majority, the company has as yet made no agreement.

The feeling between the two factions of the Amalgamated union continues to be hostile and is in fact as bitter as it ever was between the members of the Amalgamated Association and of the Keystone union. The Pratt followers in the eyes of union labor are outlaws, unaffiliated with any recognized major body.

Within the last ten days a co-operative committee, consisting of two men from each depot, chosen without regard to union or non-union affiliations, has been selected by the division superintendents, and with this committee the company is now dealing with regard to grievances, conditions of employment, etc.

There is no immediate prospect that the plan contemplating payment by the company of the union dues of each man in its employ will be consummated. Eastern railroad managers have looked with great disfavor from the beginning upon the suggestion that an employer should pay the union dues of all its employees. It has certainly not been the means of uniting the street railway unions in Philadelphia, if that was its intention, as there are now three hostile unions there instead of two.

APPOINTMENT OF CONVENTION LOCATION COMMITTEE

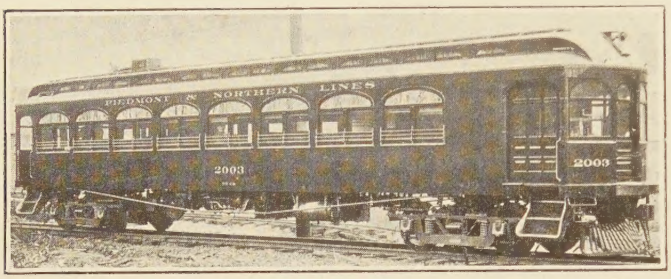
President McCarter has announced the membership of the convention location committee which was authorized at the last meeting of the executive committee of the American Electric Railway Association. This committee consists, besides the president, of Charles L. Henry, Indianapolis, Ind., and H. C. Donecker, the secretary of the association. This committee will act with a committee of six representing the Manufacturers' Association and consisting of W. L. Conwell, C. S. Hawley, J. H. McGraw, A. H. Sisson, E. H. Baker and George Keegan. The Eastern members of the committee expect to leave New York Feb. 6. The committee as a whole will visit Chicago, Milwaukee and other cities in the West which have been suggested as desirable cities for the location of the convention next fall and it hopes to be able to announce a decision before the middle of February.

The electric railway up Mount Jungfrau, in Switzerland, is nearing completion. According to the latest report, by February next it will be 11,090 ft. above the sea. Considerable pressure is being brought to bear upon the projectors of the enterprise to leave the actual summit of the mountain, 13,670 ft. above the sea, untouched.

Equipment for 1500-Volt D. C. Line of Piedmont Traction Company

The Motors Have Forced Draft and Are Permanently Connected Two in Series—Controller Diagrams Are Published

The Westinghouse Electric & Manufacturing Company is now completing the first 1500-volt d.c. equipments ever built in this country for heavy railway service. This apparatus is to be used on two railway systems in North and South Carolina, which, when completed, will comprise a total of 280 miles of track for limited and local passenger, express and heavy freight service. The first line will comprise a 35-mile line from Charlotte, N. C., to King's Mountain, which will be operated by the Piedmont Traction Company. The second will comprise 95 miles of track



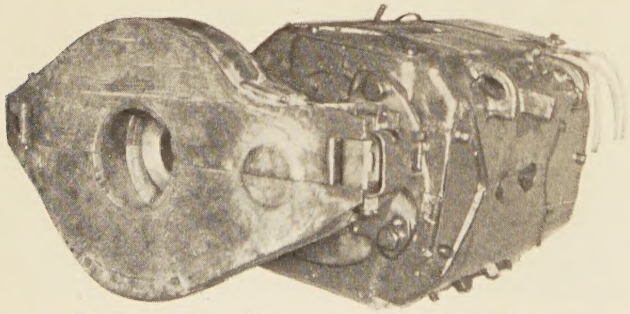
Piedmont 1500-Volt Line—Standard Combination Motor

from Greenwood through Greenville, S. C., to Spartanburg, S. C., with a 10-mile spur from Belton to Anderson to be operated by the Greenville, Spartanburg & Anderson Railway. The line will be fed from substations containing synchronous motor-generator sets, which are also being furnished by the Westinghouse company.

NUMBER AND CLASS OF EQUIPMENTS

Four classes of service are to be maintained on both systems, namely, limited passenger service, local passenger service, light freight and express and heavy freight. The motor and control equipment for both the limited and local passenger service and the light freight and express service is the same. The passenger cars, however, are geared for higher speeds and are arranged for single-end operation instead of double-end operation. The equipments for the heavy freight service differ, as will be noted hereinafter. The initial equipments are for twenty-three passenger motor cars, eight express motor cars and six locomotives. The express cars will be capable of hauling a load of 150 tons.

The equipment of a passenger or express car consists of



Piedmont 1500-Volt Line—Standard Motor

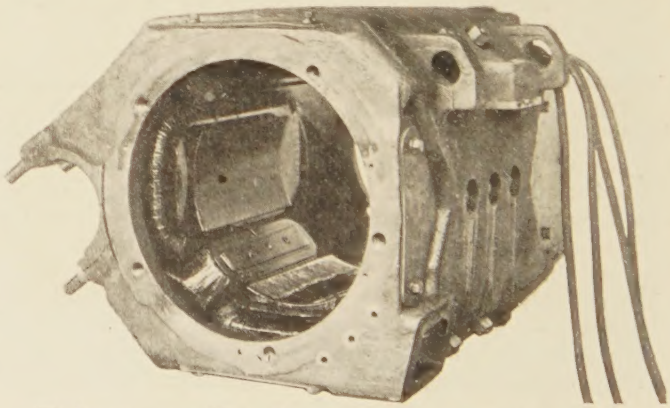
four No. 321 interpole motors which are rated at 110 hp each on 750 volts. The weight of this motor is 4150 lb. The armature is especially designed to withstand the higher voltage. For the same reason the motor has been insulated with mica, and liberal creeping distances have been provided on the end of the commutator. The brush holders have extra heavy porcelain insulators. The length of the dust ring at the end of the commutator and the clearances from the live parts of the motor to ground are also greater than in ordinary designs. The axle bearings are provided with dust guards to prolong the life of the bearings and gearing, while the motor itself is entirely inclosed. The gears for these motors are also of extra high quality.

Of the six locomotives, one will be used by the Piedmont

Piedmont 1500-Volt Line—Standard Locomotive

Traction Company and the others by the Greenville, Spartanburg & Anderson Railway. The locomotives are of the steeple type with a slanting hood at each end, and are arranged for double-end operation. They weigh 55 tons complete. They have two swivel trucks, each of 7 ft. 4 in. rigid wheelbase and a total wheelbase of 25 ft. The overall length, face to face of couplers, is 35 ft.; length over the body, 32 ft.; height from the top of the rail to the top of the cab, 12 ft.; diameter of the wheels, 37 in. Each locomotive can exert a tractive effort of 13,700 lb. at approximately 20 m.p.h. for one hour, and a momentary tractive effort on clean, dry rails of approximately 27,000 lb. It can handle a train of 800 tons at a balance speed of 25 m.p.h. on a straight, level track with 1500 volts on the trolley.

Each of the two locomotive trucks is equipped with two 308-B-5 motors rated at 185 hp each at 750 volts. The continuous rating of each motor with forced ventilation is 135



Piedmont 1500-Volt Line—Field of Standard Motor

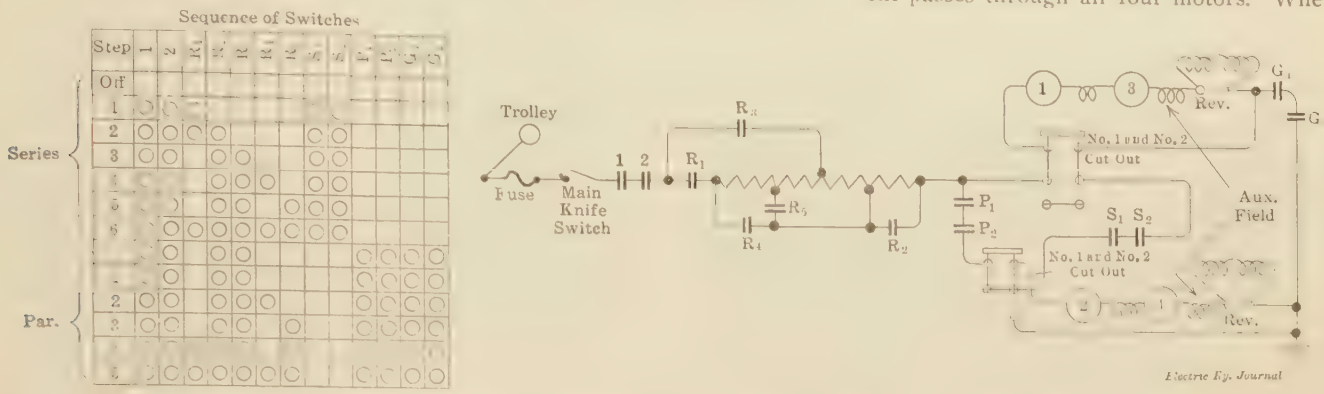
hp. A complete motor weighs 6440 lb., including the gears and sheet-steel gear case. The gear ratio is 16:57, as the locomotives are intended only for slow-speed freight work. These motors are also provided with special heat-proof mica insulation.

The forced ventilation consists of centrifugal blowers which supply air to two central conduits each connected

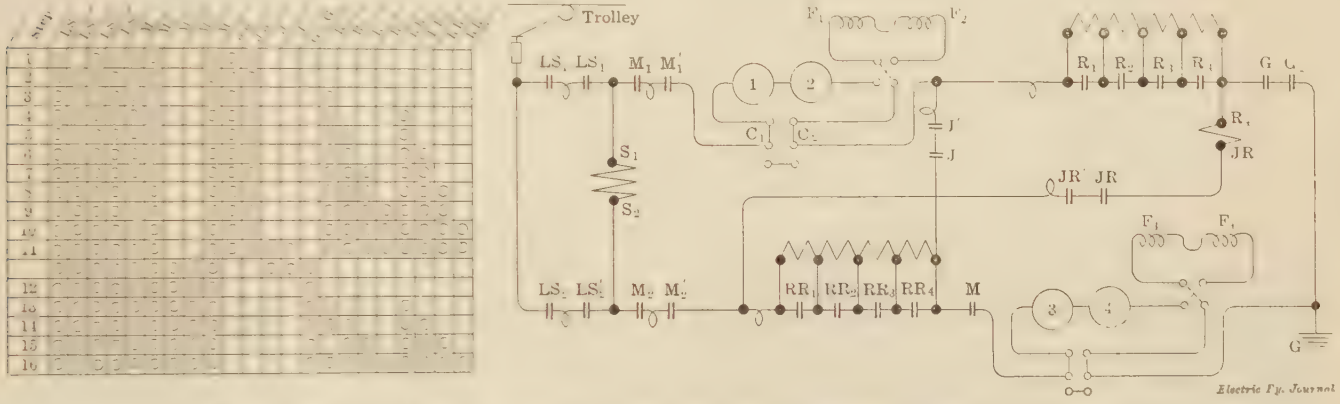
with two motors. A 13-kw dynamotor with blower is mounted in the hood at each end of the locomotive. This machine operates not only as a dynamotor and compressor motor, but it also furnishes the forced ventilation for the traction motors. This is done by mounting the blower outfit and the compressor outfit on the shaft of each of the two dynamotors, so that the continuously running dynamotors serve as blower motors besides performing their other functions. This arrangement has greatly aided the designers in securing compactness and simplicity of the locomotive equipment. The main features of the combined dynamotor and compressor outfit for the passenger and express cars are described elsewhere. The locomotive air-brake equipment is of the Westinghouse EL double-end type, with two D-3-L compressors, each capable of delivering 35 cu. ft. of air per minute. The total weight of the electrical equipment is approximately 37,000 lb.

this type permits much simpler circuits in general, it has been found more satisfactory for interurban roads than automatic acceleration.

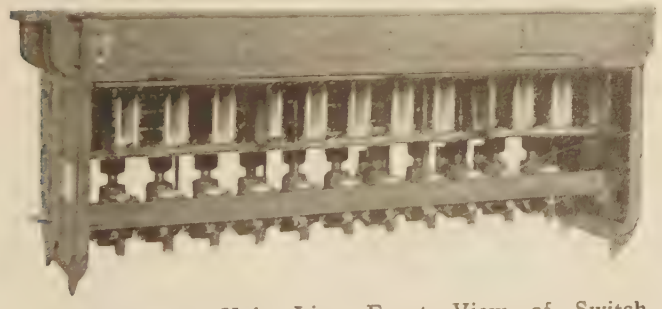
The four motors are connected in pairs, the two motors of each pair being permanently in series. When the controller is in series positions these two pairs are in series, so that the current passes through all four motors. When the controller is in any of the parallel positions the two pairs are connected in parallel. The general arrangement of the connections will be seen in the accompanying schematic diagram. Eleven of the thirteen switches are contained in the switch group. The two remaining switches are located in a separate frame or line switch, which also serves as a circuit-breaker to cut off the power from the motors automatically in case of overload or short circuits. The new switches are exactly the same as those used for the type HL-600-volt equipments, as previously noted, but more insulation and gas room is provided. On this account the dimensions of the switch group and line switch are slightly larger than those of a corresponding low-voltage equipment for the same number of switches.



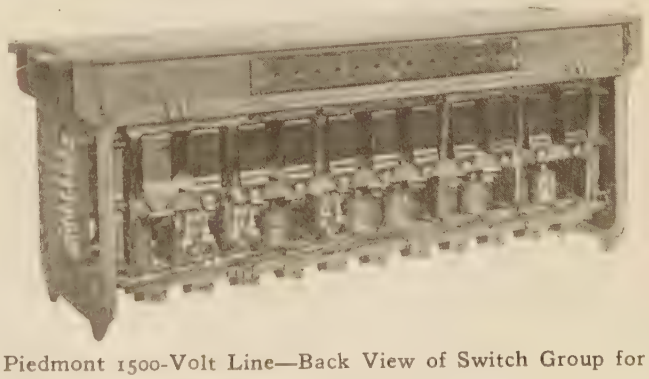
Piedmont 1500-Volt Line—Sequence of Switches and Schematic Diagram of Passenger and Freight Cars



Piedmont 1500-Volt Line—Sequence of Switches and Schematic Diagram of Locomotive



Piedmont 1500-Volt Line—Front View of Switch Group for Passenger and Express Cars

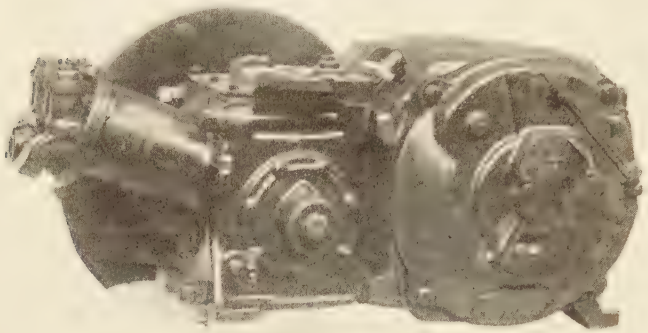


Piedmont 1500-Volt Line—Back View of Switch Group for Passenger and Express Cars

CAR CONTROL

The control apparatus for the passenger and express cars consists of the same elements as the well-known type HL control for 600-volt d.c. equipments, but the various details are modified, such as insulation distances and greater number of switches in series due to the higher voltage. The control is arranged for non-automatic acceleration. Since

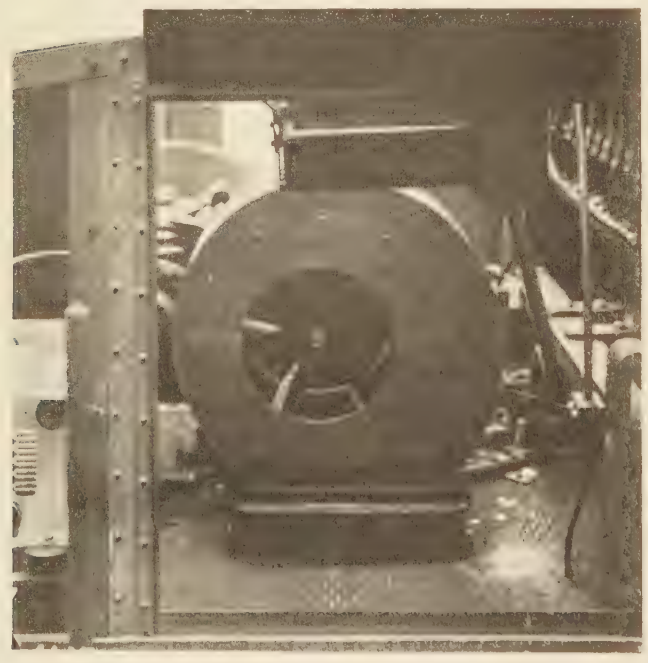
Among the important features of the switch group and line switch is the superior way in which the switches are completely inclosed to confine the arc to proper channels, while at the same time the switches may be readily opened for inspection. This advantage is obtained by using a new insulating switch box which has a removable back. The box is made of molded material with arc chutes of extra thick asbestos lumber. A chute is easily removed merely by



Piedmont 1500-Volt Line—Dynamotor Compressor for Passenger Cars

pressing the small springs which hold each side in place.

The reliable character of these switches and their ability to convey safely current at 1500 volts have been shown conclusively by severe tests at the works. In one case one of the 500-kw, 1500-volt motor-generator sets intended for substation service was short-circuited nearly a dozen times in succession through one of the line switches. Despite this severe experiment the line switch opened the circuit each time and was still in good operating condition at the expiration of the test. The magnet valves, which operate the switch groups, line switch, reverser and dynamotor change-over switch, are operated by means of current from



Piedmont 1500-Volt Line—Blower End of Dynamotor on Locomotive

the dynamotor (or from the trolley when running on 750-volt sections) through a control resistance which, in general, is similar to that used on the type HL equipment.

The other details, such as master controllers, train line receptacles, junction boxes, etc., are similar to the standard 660-volt parts. The trolley is of standard 600-volt form, but instead of being mounted directly on the roof is placed on an insulating base made of treated lumber.

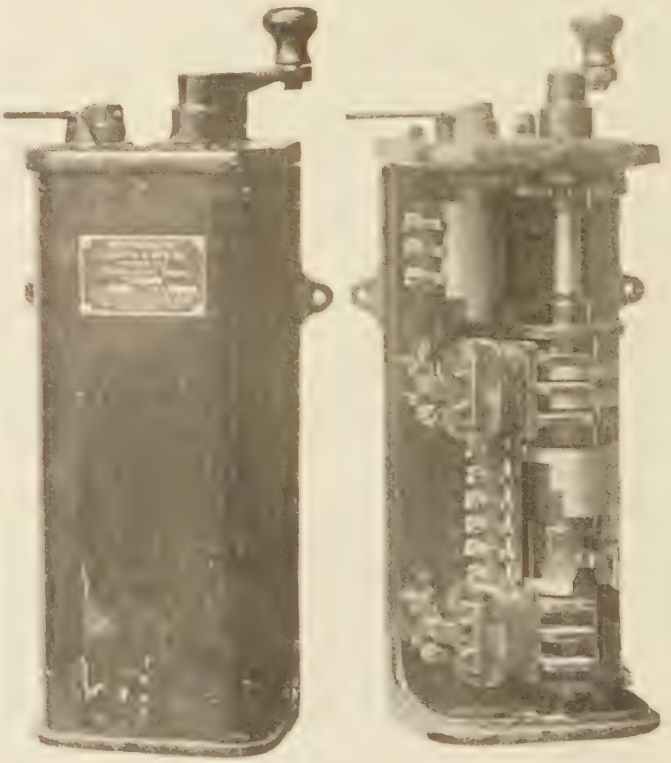
In conclusion, it may be noted that, owing to the simple character of the circuits employed, the small number of switches required and the use of the combined dynamotor compressor, the remarkable result has been produced that in spite of the increased voltage the amount of apparatus required for these 1500-volt equipments is considerably less

Piedmont 1500-Volt Line—Dynamotor Compressor for Passenger Cars

than that required on most of the existing 1200-volt equipments.

LOCOMOTIVE CONTROL

The general arrangement of the control connections of the locomotive equipments is presented in the accompanying diagram, which also shows the switches which are closed for each of the various notches. A greater number of switches, and consequently a larger number of running positions, is used on account of the greater capacity of the



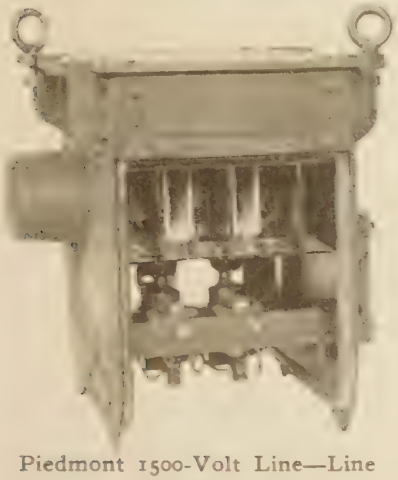
Piedmont 1500-Volt Line—Type 15-A Master Controller for Passenger and Express Cars

locomotive motors, which necessarily are worked closer to the adhesion limit. Aside from this difference the general character of the apparatus is practically the same as for the cars.

DYNAMOTOR COMPRESSOR OF MOTOR CARS

In previous high-voltage d.c. equipments it has been customary to use a continuously running dynamotor to obtain 600-volt current for operating the control and lighting cir-

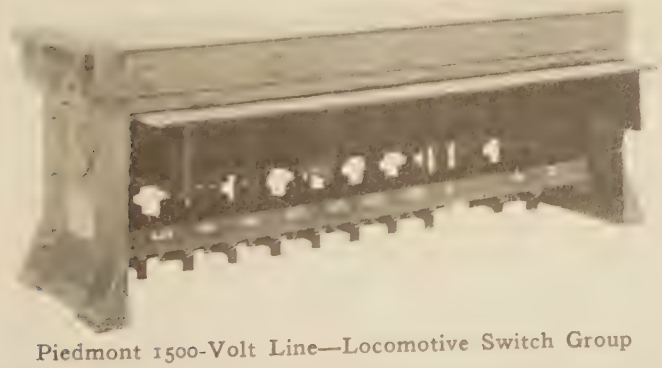
cuits, while a high-voltage d.c. compressor has been used for the brake equipment. In the present equipment these two functions have been combined in a single outfit at a considerable economy in weight as well as a reduction in the number of pieces to be cared for. The same machines which serve as a dynamotor for delivering 750-volt current for the control and lighting circuits are used to operate the air compressor, the latter being connected and disconnected to the continuously running dynamotor by means of a multiple-disk clutch. This clutch normally is held by a suitable spring in the closed position, so that the compressor is normally connected to the dynamotor. Whenever the air pressure reaches its proper value, however, the operation of the governor admits air to a small cylinder which disconnects the clutch and stops the compressor but allows the dynamotor to continue running. This apparatus has withstood very exhaustive tests at the factory, and it promises excellent results in regular service.



Piedmont 1500-Volt Line—Line Switch

The dynamotor connections are so arranged that, if desired, one-half of the winding may be disconnected and the machine allowed to run on the other half only and on half voltage as a compressor motor. If it is desired to operate a car on a 600-volt or 750-volt circuit in cities or towns the dynamotor connection may thus be changed and the full-speed operation of the air compressor obtained even on the low-voltage sections. This affords many advantages over the use of a compressor driven by a high-voltage motor, since in that case the compressor could operate only at very low speed when on low-voltage lines.

For convenience in changing the dynamotor connections from 1500 volts to 750 volts, and at the same time connecting the lighting and control circuits either to the dynamotor or directly to the trolley, a dynamotor change-over switch is provided beneath the car and a small canopy switch near each master controller for operating the change-over switch. This change-over switch consists of a single magnet valve and pneumatic cylinder similar to those which operate the switches of a switch group or line switch, but



Piedmont 1500-Volt Line—Locomotive Switch Group

carrying a double pair of contacts which establish the proper dynamotor and auxiliary circuit connections. This switch normally is held in the high-voltage position by means of a powerful spring, and is held in the low-voltage position, when desired, by the admission of air to the pneumatic cylinder. Any failure of either air or electric power therefore returns the switch to the high-voltage position, which, of course, is the safe one at all times.

NEW AGREEMENT BETWEEN BERLIN STREET RAILWAY AND BERLIN MUNICIPALITY

The municipality of Berlin and the Grosse Berliner Strassenbahn have recently entered into a new franchise agreement, the essential points of which are given below.

The city has extended the franchise to Dec. 31, 1939, but it reserves the privilege of extending the operating rights of the company to the end of the year 1949 or else to purchase the property as hereinafter described.

The railway has waived all claims to losses which it might sustain through the building of competing street railway lines in the so-called ring, or business, district of Berlin. The possibility of such losses has been reduced, however, by the grant to the railway of a number of new franchises and joint operating rights.

The railway is permitted to make connection with its subsidiary suburban lines without express permission from the city. It is obligated, however, to extend its lines and change its schedules from time to time in accordance with certain stated conditions. Until the end of the year 1919 the uniform fare will be 10 pfennigs (2½ cents) as at present, but following that year the company will be permitted to charge 15 pfennigs (3¾ cents) for trips over 3.1 miles and 20 pfennigs (5 cents) for trips over 6.2 miles.

In accordance with the earlier agreement, the railway must pay to the city 8 per cent of its gross earnings as long as the present fares are in vogue. When the fare increase takes place the railway will have to pay 10 per cent of its gross earnings to the city. In addition the city, following the former arrangement, will also receive one-half of all profits remaining after 12 per cent has been paid on $5,496,000 of stock and 6 per cent on the remaining capitalization. The only change made in this connection is that the city will receive two-thirds instead of one-half of any surplus remaining after a 10 per cent dividend has been paid on the total capitalization.

The paving agreement, which has been left practically unchanged, obliges the railway to maintain the paving for 24½ in. on each side of new rails, but the city is to aid with a subsidy.

The city has the right to purchase the entire railway system on Jan. 1, 1920, 1930, 1935; also between 1940 and 1945 in case the city has previously requested the railway to continue operation until 1949. The purchase price is fixed at twenty-five times the average dividend paid during the last seven years of operation. In case of such purchase, all debits and credits, including all reserve funds, etc., will be taken over by the city. If the city does not take advantage of this privilege, it can take possession of the property on Dec. 31, 1939, in either of two ways. One method is to pay the book value of the property less 40 per cent, and the other is to use the taxable value as a basis. In the latter case the payment would be equal to 50 per cent of the replacement value new of the property. In the first case Sinking Funds I and II, covering respectively the renewals of right-of-way and operating equipment (except power generation), would be taken by the city, but in the other case it would get possession only of Sinking Fund I. At the end of the year 1910 Sinking Fund I was $1,296,000, and Sinking Fund II was $348,000. If the agreement should be terminated on Dec. 31, 1949, the entire property may be taken over by the city merely by paying for the land occupied by the buildings and for operating equipment.

The railway has agreed to make a single payment of $5,550,000 to the city as compensation for extensions and new lines and for the city's acknowledgment that the right-of-way should continue to belong to the railway after 1920. The railway has also agreed to pay 5 per cent of the construction cost for the use of the Brandenburgertor-Franz-Josef Platz tunnels to be built by the city and has also agreed to pay 5 per cent on one-half of the construction cost of making new streets for traction lines.

Association Papers and Reports

Charles A. Coffin Discusses the Economical Limitations Upon Electric Railway Development—John H. Pardee and A. W. Warnock Consider Publicity—Reports Are Published of Committee Meetings on Jan. 27 and on the Afternoon of Jan. 26

In the last issue of this paper an account was published of the midyear conference of the American Electric Railway Association on Jan. 26. In addition to the papers read at that meeting and published last week, Charles A. Coffin, president General Electric Company, presented an address in the discussion on the paper by Guy E. Tripp on "Economic Limitations Upon the Development of Transportation by Electric Railways." At the afternoon session John H. Pardee, New York, and A. W. Warnock, Minneapolis, presented discussions of the paper by James H. McGraw on "Publicity." Abstracts of these discussions follow:

DISCUSSION ON ECONOMIC LIMITATIONS UPON THE DEVELOPMENT OF ELECTRIC RAILWAYS

BY C. A. COFFIN, PRESIDENT GENERAL ELECTRIC COMPANY

I am not here with the expectation of offering anything in the nature of instruction; I came rather to be instructed, and I have certainly learned much of great interest and value from the admirable addresses of those who have preceded me.

In meeting so many who are expert in their profession, I am reminded of an address by Mark Twain at a convention of life insurance agents. Admitting his unfitness to deal with the questions under discussion, Twain at the same time confessed that he had always believed that he had a special, though undisclosed, genius for operating a life insurance company and if put in charge of one he could achieve great success, for statistics disclosed that 97 per cent of all men died in bed; therefore, he would simply never insure a man who ever went to bed at all.

I do not mean to suggest that the difficulty of making money in electric street railway enterprises is as great as to operate a life insurance company upon the principle enunciated by Twain; yet we must admit, unfortunately, that during the past years there have been cumulative difficulties in the way of those who have been doing strenuous, persistent, wearing and irritating work, to the end that investors in the properties which they administered might receive a reasonable return. The difficulties in the way are partly inherited and partly achieved—if it is proper to speak of achieving a difficulty—but they have come to be recognized as serious and vital and full of discouragement.

In listening from time to time to discussions of the problem and in getting the crumbs dropped from the table of those who know much more of its practical side than I do, I have reached the conclusion that the misfortunes which have followed the tramway investors are, to a very considerable degree, their own fault, and that they could have been largely provided against by the exercise of that caution which should always govern when one goes out of the beaten paths of his own experience.

I have heard some generalizations, such as that no interurban road can pay operating expenses and upkeep which has gross earnings of less than $3,000 to $3,500 per mile. I have heard statements that there is an easily ascertainable figure which represents the average loss by accident, just as there are reliable figures covering the average loss by fire and the average loss of human life, etc. One of the misfortunes of the early investors in small properties was to depend upon this law of averages, forgetting its unsafety and that there should always be a wide margin for contingencies. No man can afford to insure his own premises, nor can a man in ordinary circumstances afford to insure his own life. A railway company cannot safely rely upon the law of averages, except in the case of properties of the largest class; and the expectation that a per mile gross income of $3,000 to $3,500 would be sufficient to pay all operating costs, depreciation, interest, dividends, etc., has led to many a disaster.

The confiding investor, particularly in the early days, followed the lead of the optimistic promoter; and I doubtless reflect the experience of many men in this room, as I speak from my own, when I say that many unprofitable and unfortunate tramway ventures, with not only the pain of individual loss but the humiliation in failure to "make good" for those for whose investments we were trustees, were the result of blindness to existing conditions, undue optimism, and often of sheer recklessness. We have all erred:

(1) In greatly overestimating the receipts per car mile.

(2) In greatly underestimating operating expenses.

(3) In relying upon irresponsible estimates of cost of construction.

(4) In greatly underestimating depreciation; in fact, the old-fashioned way was either to make no allowance whatever or altogether an inadequate allowance therefor.

(5) In ignoring the important point which Mr. Tripp so ably pointed out—the inevitable increase in the long haul

It is quite clear that the cumulative effect of all the errors I have recited has been to place upon the shoulders of the promoters and those who so guilelessly supported them the burden of responsibility. We should not attribute failure, as we too often do, to inherent difficulties in the industry itself. If we were to start over again and give intelligent and painstaking consideration to all the questions in respect to which there have been great carelessness and irresponsibility, the result would be the existence of 25 per cent or 33 1/3 per cent less mileage of electric interurban roads at this time and 90 per cent fewer failures thereof.

Now, you may say that this is self-evident and you may fairly ask what the present remedy is. You are far more capable of proposing remedies than I am, but as one who has given more or less attention to operating statistics, who has seen during the past years organizations and reorganizations pass by in review, who has been a fairly liberal patron of street cars, and who has listened to many recitals of distress from those who have in many cases lost a considerable portion of their fortunes in these ventures, a few general suggestions occur to me.

One of the chief suggestions I have just been dealing with—the failure to observe proper caution and the ignoring of one of the first principles governing investors, that is, of having recourse to the most conservative and reliable experts before making the leap. It is very curious that so many people approach a precipice of speculation with so much greater recklessness than they approach a physical precipice, when they should be approached with equal caution. Had we all been sufficiently guarded in the initial steps, our difficulties and the criticisms to which we are subjected and our loss of reputation, which is of greater value than money, would be greatly minimized.

Attractiveness and cleanliness of equipment play a great part in the successful operation of street railways. I was in one of the large cities of the country recently, where it

would have been a convenience to ride frequently in the electric cars. I found the cars so filthy externally as to suggest an unsanitary condition internally, with the result that during the few days of my sojourn I chose to walk a considerable distance each day rather than to ride in cars which were externally so repulsive. This suggested to my mind that the effect of this uncleanliness must be greatly accentuated in the case of residents of the city and that owing to this unsavory condition the company must have suffered a material loss of patronage.

Again, we are all affected by the observance of courtesy and tact or by the absence of these virtues on the part of street railway employees. Every employee of the company exerts an influence for helpfulness or for injury to the interests of his company, and carelessness, discourtesy or unwisdom on the part of an officer, representative or employee may affect, in one way or another or in a variety of directions, the revenues of a property to the extent of one-half of 1 per cent, 1 per cent or more, and the cumulative influence of all may have a potent and damaging result. Of no enterprise is it more true that vigilance is the price of liberty than in the direction and operation of tramway enterprises, where the margin between success and failure is oftentimes exceedingly narrow.

An obvious and inherent difficulty under which an electric railway lives is that of a poor load factor and one which is characterized by exceedingly high peaks. On this account it is often of greatest importance that the business of the company be diversified by the sale of current for power or lighting, or both. The load factor is thus greatly improved and such added business is more free from attack or interference than are rates of fare. I have known many tottering interurban enterprises which could have been saved and made fairly profitable by adding to their business the distribution of current for light and power purposes.

Then there should be the cultivation of the best possible relations with municipal authorities and frankness in putting before them your difficulties, not by spectacular methods, but as you would talk in confidence with your neighbor or stockholder. The want of knowledge of your situation or the existence of a false idea as to your profits may result in an insistence upon lower rates, universal transfers, unwise extensions and other embarrassing things which may hamper you in every direction.

I have called attention to things each one of which in itself is of greater or less importance; and, taken as a group, they are considerations which, in the aggregate, may vitally affect any given situation.

It may be said that all this is more or less of a dilettante discussion, but I am only aiming to give you my impressions of those things which, in a small degree in one case, in a somewhat larger degree in another, and in other cases in still greater measure, may result in fortifying your investment and in creating a changed attitude on the part of the public, whose favor and confidence are so distinctly essential to your success.

DISCUSSION OF THE PAPER ON PUBLICITY

BY JOHN H. PARDEE, VICE-PRESIDENT J. G. WHITE & COMPANY, NEW YORK

The average official and the average individual member of each municipality have the idea nowadays that any public utility is a grasping monopoly and is receiving an income from which undue and enormous private profits result. This idea may not be crystallized in the mind of such citizen or municipal official, but the idea is there just the same and finds expression in criticisms of service by relating to a neighbor or chance acquaintance some real or fancied injustice done by such public utility, its officers or agents, and such criticisms increase in the telling as a social scandal grows with its culmination in the blackened character of the victim. All public utilities are supposed by us to be fair and just, and, on the theory that if the community can be fully informed it will as a whole recognize such fairness and justice, we have all most earnestly discussed publicity as a panacea for the ills from which we have been suffering during the past few years.

DEFINITION OF PUBLICITY

Publicity has been defined as "the state of being public or open to the observation or inquiry of a community."

To my mind practical publicity for us is divided into the following subjects, or, rather, may be expressed and promulgated by the following methods:

(1) Service.
(2) Attitude of employees.
(3) Newspapers and circulars.
(4) Position of executive officials before the public.

SERVICE

This may not in the strict sense of the word be publicity, but as we are perhaps using the word to mean a method of cultivating cordial relations with the public we include it. I think we all agree that service is fundamental and nothing further need be said on this phase of the subject.

ATTITUDE OF EMPLOYEES

A city street railway has a separate business transaction with each individual each time he or she pays a nickel—alas! lately in some instances each time 3 cents is paid—and consequently a company with an annual income of $1,000,000 has 20,000,000 separate and distinct sales of its wares, namely, transportation. To negotiate and consummate these 20,000,000 transactions we employ conductors who are our special representatives and have to deal with all the different classes of people. In these conductors we have publicity—"a state of being open to the observation or inquiry of a community." The community observes the feeling toward it either good or bad which the company expresses intentionally or unintentionally through this medium. It also learns in conversation with the employees whether they respect and admire their superior officers and the corporation itself, whether its dealings with its men are fair and just, and whether the men are proud of their employment, and it should be borne in mind that such information received by passengers in that way or from overheard conversation between employees is looked upon as "inside" and consequently particularly reliable.

As stated above, conductors are our salesmen, and if genial and properly informed they will accomplish infinitely more paying publicity than thousands of circulars or numberless newspaper ads.

Do we all realize the importance of this and can we not very profitably use some of our publicity appropriations for the better education and training of our commercial and financial agents, the conductors?

NEWSPAPERS

Much has been written on this subject, and I firmly believe that a company should continually give to the newspapers full and complete stories of its construction work, description of its shops, power houses, the workings of its different departments, accurate and prompt information regarding accidents, amusing incidents, reasons why schedules are interfered with and any item which can be written up, all, of course, with judgment.

When an unjust attack appears reply to it by explaining the facts in a perfectly logical and fair, but at the same time dignified, manner, and the intelligent public will appreciate it.

If we deal frankly and honestly with the reputable press we shall, as a rule, receive the same treatment.

PUBLIC STANDING OF EXECUTIVE OFFICIALS

Our business is frequently as large or larger than any other enterprise in the community and just as reputable, and consequently it should be looked upon with the same respect and consideration.

It devolves upon the executive head of any company to take an active personal interest in all non-political affairs of the town or city, and by his business ability and assistance therein to create for himself a position of confidence and respect which is quite separate from his official connection. If this is accomplished, the business community relies upon him as a man, and any statements or arguments he may make for his company receive greater consideration.

This is publicity of the highest type.

In this connection I believe that many of us have erred in the past and particularly because we have permitted ourselves unwittingly to appear as apologetic for our employment as executives of a public utility company.

We should not only be proud of the fact that we represent an industry which has done as much as any to develop and civilize the country but should stand up before the community and say: "My company is a large one; it is conducted fairly and honestly; I am its executive head, and I am proud of it."

DISCUSSION OF THE PAPER ON PUBLICITY

BY A. W. WARNOCK, GENERAL PASSENGER AGENT TWIN CITY RAPID TRANSIT COMPANY

I must confess to a great deal of admiration for Mr. McGraw's paper, possibly because fifteen years of newspaper training have molded my thoughts to take the same view of this subject that he has done; I was connected with newspapers until I got into the street railway business. I am glad that Mr. McGraw took the highly ethical ground that he has taken in the discussion of this subject, rather than to give his attention to the matter of detail; for, after all has been analyzed, we must get back to the basic fact that we all think we are being ill used. The street railway business is to-day practically a new business, but, nevertheless, we have not outgrown the old-fashioned arbitrary traits with which we started in the business many years ago.

A policy of publicity, to my mind, makes no particular difference unless the facts are understood plainly. We have in Minneapolis and St. Paul an elaborate complaint department, which I confess was organized largely because of the inspiration created by the methods of Mr. McAdoo. I have had charge of that department, and at our solicitation he has given us the benefit of a good many criticisms concerning the work. Mr. McAdoo has adopted a wise attitude toward the public. He tries to find out every possible cause of complaint which may exist before the complaint is actually lodged against the company. Mr. McAdoo told me that when the Hudson Terminal Building was about completed and ready for occupancy he called in the rental agent and told him to provide a "complaint rack" for each office. The agent said, "You will flood us with complaints." Mr. McAdoo replied, "Let us have the complaints before anything happens to justify the tenants in complaining to us."

I believe a classification of the complaints which are made to a street railway company may be given roughly under three heads: First, insolence or incompetency of our trainmen; second, some mischance in connection with a transfer, or wrong change or something to do with the collection of fares; third, some accounting or transportation arrangement, as to schedules, etc., over which the company has no control.

The science of publicity is not simply the matter of getting write-ups in the newspapers or distributing booklets and pamphlets among the people. I agree with Mr. McGraw's view, it has a highly ethical touch to it; and the proper administration of practical publicity is a matter which calls for considerable skill and judgment. The trouble is that the companies have too many men in the publicity departments of their roads to whom they are paying $18 a week. A proper representative of the publicity department of a street railway company should have considerable gray matter above his eyes, and men of that calibre are paid handsome salaries.

I say that the question is basic, and it is a question to which you can go back and make yourself right. It is like the story of the Prodigal Son, the best story ever told, about a man coming to himself. First of all, he had to admit he was wrong, and that is one of the things which is not quite true of street railway men at all times. I had for a long time an idea that it would be a very dangerous thing to ask the public to make criticisms and complain of the service which was offered. I thought it might be a very dangerous thing, but at last I plucked up my courage and by means of a large placard, printed in bold type, displayed in each car, we invited criticisms, suggestions and complaints. In the Twin Cities, where we have eight daily newspapers, the newspapers used to be flooded with criticisms of the street railway company. The people who had an imaginary or a real grievance would make complaint to the operating department, and they would get a letter saying that their complaint had been received and would have attention, but somehow or other the people would not feel satisfied.

Now, the fact is that to-day in Minneapolis and St. Paul we get from fifteen to twenty-two complaints a day regarding the street railway service, and the newspapers do not get any, because the people feel that they have the right to come to us.

Now, as to the method of handling complaints. I have seen replies to letters of complaint which were discreditable, both as to the method of construction and the language used in the letter. If you are compelled to admit to yourself that you do not possess the happy faculty of so expressing yourself in a letter as to create an amiable impression in the mind of the recipient who has made a complaint about the service, I would advise you to get a man who can so express himself and to let him do the letter writing.

Let us assume that a man comes into the office with a fancied grievance. He comes in with a certain state of facts, real or imagined, and you might sit down with him and argue with him that he is absolutely wrong. That would be a very tactless thing to do. My idea would be to throw the cards down and say, "You are absolutely in the right," and then quietly and tactfully prove your position before he got away. In the first place, if you go to work and argue with him at the start, you do not convince him —you may convince yourself—but he goes away feeling even more strongly about the matter than he did when he came. The man who takes the trouble to make a complaint about the service ought to be pacified. You do not necessarily sacrifice your own ideas as to the right and wrong of the proposition, and it will not be to your disadvantage to yield to the person in this way. He goes away and is your friend.

In my opinion, complaints are the best things a company can have. Mr. Goodrich and I are the only two who handle the complaints that reach our company. He keeps in close touch with that matter. He knows the character of the complaints that come in each day. He thinks the best thing the executive officers of our company can do is to know the character of the little complaints that come in every day, because that indicates the trend of public opinion.

There has not been, at any stage of the electric railway business, a high-grade, intelligent, effective publicity system inaugurated and developed for the benefit of the company. The reason why many people kick to-day is because there is a general impression that the street railway companies are very prosperous. Mr. McAdoo was successful in getting a 7-cent rate of fare on some of the lines of his railway, because he could show that he was not prosperous. Many of the matters which give ground for complaint and

cause the railway companies so much trouble could be adjusted very easily if attention was paid to the matter; and if we go to work first of all to remove the cause, we shall find that there will be a great decrease in the number of complaints. First of all, I should say that we should undertake a thorough education of our trainmen; have them feel inspired that it is a business worth being in; make them appreciate the fact that they are engaged in a useful occupation, which calls for the exercise of much judgment and ability. This would have its effect on the men and you would find that the number of complaints of trainmen would become very much less.

Mr. McGraw made a point I have been thinking of for a long time. I thought what a fine thing it would be if the electric companies of this country would combine in some way to buy a certain number of pages in the magazines and in the large newspapers of the various cities and advertise the facts connected with their properties. We have not an organized voice in this business in the United States to-day. No matter how much you promote your motorman, he can never be fitted to do this class of work. The man in charge of the publicity work must be a man like Mr. McGraw. I am just beginning to think that the dawn is brightening for street railways, and that we are coming to a realization of what a powerful agent we shall have with real, intelligent publicity. I tell you it is the best thing in the world to find out what is the matter with us and to try to remedy it. The public wants information concerning your properties, real information which is vital to the existence and the operation of your roads.

Some time ago we spent $20,000 on a series of advertisements in the Twin Cities with no other purpose except to tell the people what we were doing. Our company had been doing business for many years, and there were a good many facts the people did not know—the miles of track comprised in the system and how much it cost, per mile, to lay the track. We have heard more from those advertisements and have reaped more benefit from them than from anything else of that kind that we have done. The people were proud to read the articles, and we made many friends by that campaign of publicity.

You cannot go to work and establish public opinion in your favor unless you first of all make it evident that you have an earnest and sincere desire to remove all possible causes of complaint.

When we get a complaint, or anything that looks like a good suggestion, we take it up immediately and we use great pains in writing letters of reply. We will go to all possible extremes to adjust simple, trivial matters of complaint, and perhaps we overdo the politeness in our letters, but the net result is that the complainants become our friends. A man who is concerned sufficiently to write a letter of complaint regarding something which he deems important will become a friend if you comfort him and explain a new viewpoint to him. I am looking for the man who has enough steam in him to kick. If he has a just cause for his complaint we can smooth it out, and if he has no just cause we can smooth that out too.

EXECUTIVE COMMITTEE MEETING OF TRANSPORTATION & TRAFFIC ASSOCIATION

Those present at the meeting of the executive committee of the Transportation & Traffic Association at New York on Jan. 27 were J. N. Shannahan, New York, president; Dana Stevens, Cincinnati, Ohio; M. C. Brush, Boston, Mass.; H. A. Nicholl, Anderson, Ind., and H. C. Page, Worcester, past-president. H. C. Donecker, secretary; J. Stanley Moore, Syracuse, N. Y.; W. R. W. Griffin, East Liverpool, Ohio, and W. H. Sawyer, New York, chairmen of committees of the Transportation & Traffic Association, were also present.

At the opening of the session Mr. Donecker read the names of a number of railway men who had signified their intention of affiliating themselves as associate members—now as members—with the Transportation & Traffic Association. In this connection President Shannahan explained that every person who joined the American Electric Railway Association as an associate member had the privilege of affiliating himself with any one of the four associations or with the parent association, and at his suggestion he was authorized to appoint a committee of three to act with the associate membership committee to set forth the advantages of affiliation with the Transportation & Traffic Association.

The secretary then read the report of the committee on subjects. As the time of the association at the convention will be largely taken up with reports of committees only one topic for a separate paper was suggested, namely, that of the operation of one-man cars. It was the opinion of the executive committee that this had become a live question because of the more general use of prepayment cars, and President Shannahan was authorized to secure a paper on this subject. The committee also decided to discontinue the committee on subjects because, with the many standing committees of the association, time for the presentation and discussion of individual papers has become limited. The committee also decided that at future conventions abstracts only of committee reports would be read and not the complete report. This plan has been adopted to save time at the association meetings.

The report of the committee on city rules was then presented. An account of the meeting of this committee was published last week. In addition Chairman Peck stated that the matter of harmonizing city and interurban rules had been begun by the appointment of W. B. Rockwell, of the city rules committee, and J. J. Doyle, of the interurban rules committee, to report on the present differences in the two codes. The report was accepted.

The report of the committee on express and freight decided, in addition to the matter printed last week, to prepare two sets of data sheets. One will be sent to those companies which are now engaged in the business, and the other to those companies which have not yet undertaken it.

The executive committee voted to request the joint committee of the Engineering and Transportation & Traffic Associations on multiple-unit operation to take up the subject of multiple-unit operation for interurban lines as well as for city lines. As most of the members of this committee are connected with roads furnishing city service only, President Shannahan was authorized to appoint an additional member who should have had experience with the transportation conditions of the Middle West and to ask Mr. Ackerman, president of the Engineering Association, to appoint an interurban railway engineer from the Central West to this joint committee. As changed, the committee will now consist of eight members instead of six.

The reports of the committees on schedules and timetables, fares and transfers, training of transportation employees, block signals, statistical unit and passenger traffic were accepted. Short notes on the meetings of these committees were published last week. Chairman Moore, of the committee on passenger traffic, stated that J. P. Potter, Oakland, Cal., had resigned from the committee and that President Shannahan had appointed in his place E. W. Ford, of Memphis, Tenn.

M. C. Brush, Boston, chairman of the committee on uniform definitions, reported that that committee had held a meeting on Jan. 27. Its plan to compile a list of the terms used in the transportation department which seem ambiguous or synonymous is described on the next page.

General G. H. Harries, who had joined the executive committee in the meantime, was requested to arrange for a conference between the committee on rules of the American Railway Association and the committee on interurban rules of the Transportation & Traffic Association.

In conclusion President Shannahan announced that the

executive committee of the American Electric Railway Association on Jan. 26 had approved the codes of rules for city service and interurban service as amended by the Transportation & Traffic Association at the Atlantic City convention.

MEETING OF EQUIPMENT COMMITTEE

The meeting of the committee on equipment of the American Electric Railway Engineering Association was held on Saturday, Jan. 27, at the association headquarters in New York. The members present were Chairman F. R. Phillips, Pittsburgh; A. T. Clark, Baltimore; E. W. Holst, Boston; L. M. Clark, Indianapolis, and D. E. Blair, Montreal. Henry J. Gulick, of the Gulick-Henderson Company, New York and Pittsburgh, and H. H. Adams, New York, were also present to assist the committee.

The members discussed the program of subjects laid out by the executive committee of the association, for each of which sub-committees have been appointed as follows: On high-grade insulating compound, H. L. Patterson, Youngstown, A. T. Clark and D. E. Blair; on couplers for interurban cars and end connections on cars, F. G. Grimshaw, Camden, L. M. Clark and H. L. Patterson; on self-propelled cars, E. W. Holst, J. M. Bosenbury, Peoria, and W. Thorn, Chicago; on heat-treated gears and pinions, A. T. Clark, F. G. Grimshaw and D. E. Blair; on end wear of journals, J. M. Bosenbury, D. E. Blair and F. G. Grimshaw; on squealing of steel wheels, L. M. Clark and E. W. Holst.

In addition to the foregoing sub-committees, Chairman J. S. Doyle, New York, John Lindall, Boston, and Hugh Hazelton, New York, have been asked to continue as a subcommittee on specifications for heat-treated axles, shafts and similar parts, cold-rolled steel axles and ordinary carbon steel axles. These specifications may be prepared in conjunction with the American Society for Testing Materials. A similar sub-committee on specifications for steel wheels will consist of Chairman E. W. Holst, H. A. Benedict, Newark, and H. J. Gulick. The sub-committee on standard specifications for wrought iron, also continued from 1911, will consist of A. T. Clark and C. F. Woods, Boston.

It is planned to have the reports of the various sub-committees ready for discussion at the next meeting of the committee as a whole, which will probably be held in Pittsburgh late in April or early in May. It is hoped that the final report will be ready for adoption at a meeting suggested to be held in Chicago about the middle of June.

COMMITTEE ON DEFINITIONS

The committee on definitions of the Transportation & Traffic Association met on Jan. 27 to make plans for its work during the coming year. The following were present: Matthew C. Brush, Boston, Mass.; W. C. Callaghan, Rochester, N. Y.; I. H. McEwen, Utica, N. Y. The committee decided to make its inquiry broad in scope and to define the terms that are used in the transportation department. A request will be sent to a number of companies for information regarding terms in use in different parts of the country, and particularly those movements of cars, etc., for which conflicting terms are applied in different sections. It was decided, in order that the interurban lines in the Central West might be represented, to ask that the committee be increased by the addition of one member from that section.

JOINT COMMITTEE ON ENGINEERING ACCOUNTING

A meeting of the joint committee on engineering accounting, representing the Accountants' and the Engineering Associations, was held on Jan. 26, 1912. Those present were F. B. Lasher, New York City, co-chairman, and J. C. Collins, Rochester, N. Y., from the Accountants' Association, H. H. Adams, New York City, and John Sibbald, Gloversville, N. Y., from the Engineering Association, and P. S. Young, Newark, N. J., president of the Accountants' Association.

The following sub-committees were appointed: J. H. Hanna, Washington, D. C.; C. E. Thompson, Chicago, Ill., and A. F. Elkins, Columbus, Ohio, on interdepartment charges; John Sibbald, F. B. Lasher and J. C. Collins on subdivision of maintenance of equipment account; F. B. Lasher, J. C. Collins and M. J. French, Utica, N. Y., on collection and compilation of rules for depreciation.

The subject of scientific management, including cost accounting as applying thereto, was taken up and thoroughly discussed and it was decided that this subject should be handled by the entire committee.

PUBLICITY OF ACCOUNTS

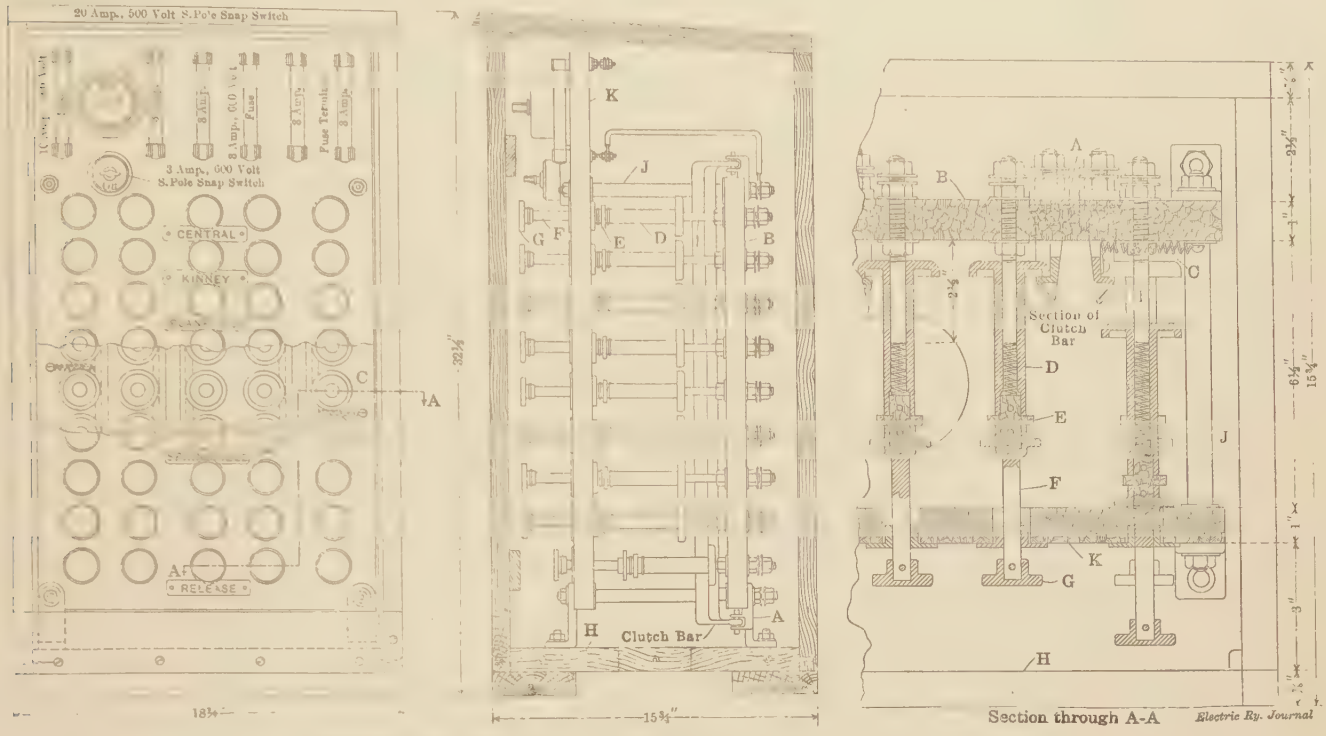
Commenting on the paper on "Publicity" by James H. McGraw at the meeting of the American Electric Railway Association, Jan. 26, *Financial America* of Jan. 28 says: "There is always an inner conviction in the minds of thinking men that much of the hostility against railroads, steam or electric, would be dissipated if their merits and exact position could be publicly set forth. Hence a system of educational publicity is essential. Even where transgressions are known to have happened, if the offending company strives honestly to purge itself, the people will give it a fair trial. In the case of transportation companies this can be done best by giving the people adequate service at reasonable cost, and by taking them into the corporation's confidence sincerely and fully. The latter obligation will not be fulfilled merely by the appointment of a publicity agent. The public confidence can be won only by the frankest and freest demonstration of corporate willingness to meet the people half-way in everything pertaining to the public right or the common good. Obviously, there must remain some matters concerning which the public is not and should not be entitled to access. Business of all kinds is allowed, under our institutions, secrecy in regard to certain matters which custom has sanctioned as privileged or strictly private. This is only as it should be and, as an exception, only defines more clearly the duty devolving upon corporations to make frank, full and sincere declarations upon all other matters. In this connection, it has come to our notice that certain industrial and other corporations, beyond the control of the Interstate Commerce Commission, still pursue the doubtful policy of 'lumping' their maintenance and repair outlay without particularizing or definite specification. This is not as it should be, and no stretching of the rule of 'privilege' can justify such reports to stockholders or the public. In this respect, there is room for improvement in the 'publicity' relations of many corporations, and we feel certain that their standing in the public estimation would be considerably enhanced if they were to reform the practice to which we have called attention."

The report of the London Traffic Branch of the Board of Trade, published recently, contains an account of the findings of a departmental committee appointed by the Postmaster-General to consider the question of the transmission of mails in London by pneumatic tube or electric railway. The committee, which reported last February, recommended electric railways in tube 7½ ft. in diameter, laid in the London clay and accommodating two tracks of 2-ft. gage. They are in favor of motor wagons, in preference to locomotives and trailers, having each pair of wheels fitted with a motor designed to develop a maximum speed of about 35 m.p.h.

RELIEF FOR TRAFFIC CONGESTION IN NEWARK

The Public Service Railway has just installed at Broad and Market Streets, Newark, N. J., a system of electrically operated semaphores to indicate the route of approaching cars. These semaphores are for the purpose of relieving the traffic congestion at that point. As described in the ELECTRIC RAILWAY JOURNAL for June 17, 1911, it was proposed to operate the system from a signal tower, but owing to objections from the city the controlling mechanism has been placed in a switch box which is operated from the sidewalk. The importance of the installation may be judged from the circumstance that during the busy hours of the day as many as 525 cars are scheduled to pass this crossing in all directions within sixty minutes. The railway management therefore conceived the idea of providing signals which would facilitate the boarding of the westbound or outgoing cars on the six Market Street lines. The method of operation and the devices used are described in the following paragraphs.

The operator is stationed at a central cabinet on the east side of Broad Street where he can note the order in which the cars on the several lines appear when they are held back by the traffic policemen. On Market Street, west of Broad Street, are five poles about a car length apart, each of which is equipped with signals having as many blades as there are car lines. The name of the route appears on both sides of each blade. These signals are set from the central cabinet in the order in which the cars will cross the intersection so that waiting passengers can see just where their particular car is going to stop.



Assembly and Section of Control Cabinet for Public Service Railway

Mechanism for Setting the Route-Indicating Semaphores

View of Semaphores on Market Street as Taken During a Non-Rush Period

The signals are of the solenoid-operated pull type. The blades normally rest by gravity at a position of about 45 deg. behind a shield which prevents their being seen. Each blade has a wire which runs into the solenoid box beneath the signals proper. Each one of these wires is attached to

the solenoid plunger, which normally is de-energized. When the man who operates the control cabinet desires to raise a specific blade he presses the button which is electrically connected with the solenoid which is attached to the proper sign. The pressing of the button completes the circuit to the solenoid. As the solenoid becomes energized it pulls upon the plunger and thereby raises the blade to a horizontal position where it can clearly be seen by waiting patrons and motormen. Electric lights with reflectors are placed above the blades for night service. These selective signals are operated only during the rush hours. Each signal pole has a mechanically operated extra blade upon which are the words "Trolley Station." When these blades are shown during the non-rush hours they denote where all westbound cars stop.

The control cabinet, as shown in the half-tone and drawing on page 205, consists of five rows of buttons for the five signal poles. Each row has as many buttons as there are blades for each signal. When the operator presses a button for one of the blades it is caught by a clutch as indicated, thereby energizing the solenoid until the button is released. If the operator desires to show a different blade at the signal, the first button is automatically released as the second button is pressed. This is due to the fact that when the second button is operated the clutch of the first is released and the first button is returned to its original position by means of a compression spring before the solenoid of the second button is energized. This object is attained by the use of a common hinged clutch bar which causes one clutch to be released before another can be engaged. It will thus be seen that the signals can be operated with one-half the movements that would be necessary if the operator were compelled to restore one button before pressing another. This feature, of course, is an advantage at a busy crossing. There is also an extra or release button which can be pressed when it is desired to allow all of the blades to drop into their positions at one time.

The details of this apparatus were worked out by the American Automatic Switch Company, New York, and were manufactured by that company under the supervision of the officials of the Public Service Railway.

POWER PLANT EXTENSIONS IN VANCOUVER

On Jan. 9, 1912, the management of the British Columbia Electric Railway, Ltd., Vancouver, B. C., announced that awards had been made on tenders for the hydraulic and electrical equipment covering the proposed extension of the company's generating plant on the North Arm of Burrard Inlet. The plans for this undertaking represent an expenditure of approximately $1,000,000, and the arrangements were made on the basis of the completion of the installation during the present year.

The company's present output at its North Arm plant is 43,500 hp, which includes one unit of 10,500 hp, which was placed in operation on Jan. 8. It also has a steam auxiliary plant in Vancouver of 12,000 hp, one unit of 3000 hp at this station having been put into service during the latter part of December.

The plans for the development of the hydroelectric plant on the North Arm call for an additional installation of 42,000 hp. This will give the company an available output of 85,500 hp from this station. The company has also recently awarded contracts for the development of its steam auxiliary, making the plant available for an output of 20,000 hp, and this work will be completed early this year. The combined power at its hydroelectric and steam plant which the company will have available at the close of 1912 is 105,500 hp. In connection with the announcement the company states that plans are now in hand for the development of other power sites which will bring its total output up to 200,000 hp. This increase has become necessary through the growing demand for power.

The development of the North Arm plant will be carried on in connection with the construction of the dam at the mouth of Lake Coquitlam, 90 ft. in height. This will give a storage capacity in Lake Coquitlam of 9,000,000,000 cu. ft. During December the company completed the enlargement of the hydraulic tunnel connecting Lake Coquitlam and Lake Buntzen, from which latter point the North Arm generating plant is fed at a head of 400 ft. This tunnel was originally 9 ft. by 9 ft., but has now been increased to 190 sq. ft. in section.

The new equipment at the North Arm station, for which contracts have just been awarded, consists of three units, each of 14,000 hp.

The John McDougall Company, Montreal, will supply the 14,000-hp. waterwheels, which will be of the Doble type. The electrical equipment will consist of three generators, each of 9000-kva capacity and capable of overload to the maximum of the hydraulic equipment.

The three new units will be housed in an independent generating station, located on the waterfront of the North Arm at a point about 2000 ft. south of the existing generating station. To convey the water from Lake Buntzen to the station a hydraulic tunnel will be driven through solid granite. This tunnel will be 2250 ft. long, with an internal diameter of 15 ft. 6 in. and concrete lined throughout in order to lower the friction factor to the lowest possible point.

PROGRAM OF ELECTRIFICATION IN NEW ZEALAND

In a statement made by the Department of Public Works to the Parliament of New Zealand the following reference is made to the plans for electrifying the railways of New Zealand:

"The conditions pertaining to electrification of the Christchurch-Lyttelton Railway are being investigated and the requirements ascertained. It is anticipated that with a supply of power available from Lake Coleridge the conversion from steam to electric working will be profitable, and tenders for the work will be invited in due course with a view to its completion as soon as possible after the supply of current becomes available.

"After the application of electricity to the working of this line, its application to other sections will be considered. In the meantime all information on the subject is being collated and the progress of electrification of railways in other countries is being carefully watched. In view of the rapid extension of electric working in France, Germany, Switzerland, Norway, the United States and England, it is intended to make a systematic study of the traffic and train movements throughout the Dominion to ascertain definitely the power requirements of different sections. In other countries the electric working of railways, which has previously been limited to suburban services, is now being extended to main and branch lines, not only where the traffic is heavy but also on lines with a comparatively infrequent service.

"The department is consequently studying the application of electricity not only to suburban services, where its usefulness is undoubted, but also as an alternative to regrading, which is proving necessary on many of the main lines in order to cope with the increasing traffic."

The Winona Interurban Railway, Warsaw, Ind., will take over the light and power load of the Winona Electric Light & Power Company as soon as a short transmission line can be built and motors installed to operate the latter company's generators. The light company is now delivering about 1000 kw, at 2300 volts, 60-cycle, d.c., to Winona and Warsaw. Its plant is located within 300 ft. of the railway company's plant. If the motor installation progresses as rapidly as anticipated the load will be transferred about March 1, 1912.

CHOICE OF SYSTEMS FOR HEAVY ELECTRIC TRACTION IN THE UNITED STATES AND EUROPE

BY A GERMAN ELECTRICAL ENGINEER

The editorials in the ELECTRIC RAILWAY JOURNAL of Dec. 2, 1911, entitled "Electric Railroading at the Turin Congress" and "A.C. Versus D.C. at Milwaukee" were read by me with much interest, and I fully agree with the ideas expressed therein. It is very difficult for the European traction engineer to understand why the 600-volt or 1200-volt d.c. system should be used for many American interurban lines, while his American colleague does not understand why European railroads show such a decided preference for single-phase equipment. This misunderstanding is due to the fact that neither is well acquainted with the widely different topographical, political and financial conditions of the other man's country. The American type of interurban railway is absolutely unknown in most European countries. Its length of track staggers the European engineer, who cannot but think that these long lines must serve the same ends as the trunk railroads with which he is acquainted. His street car service, for example, calls usually for single-truck cars with two 35-hp motors. Consequently, an American interurban car with four 100-hp motors is on the same plane as one of his powerful locomotives. His government certainly would not permit a unit of such capacity to be operated on public highways at 50 m.p.h., nor can he conceive that a single trolley wheel should be capable of collecting the enormous current required by a 400-hp car.

The American type of interurban railway is gaining ground but slowly in Europe. Among roads of this type are the Vienna-Baden system, which uses 500 volts d.c. in cities and 500 volts a.c. in the country; the Frankfort-Hamburg line, with 500 volts d.c. in the city and 1000 volts d.c. in the country, and the Cologne-Bonn Railway. In Germany trunk line standards in signals, station crews, crossing protection and other features prevail as soon as the city limits are passed.

Street railways and trunk lines must be kept entirely apart when conditions in Germany are considered. The German interurban line is the steam "Kleinbahn"—a narrow-gage feeder for some trunk line which usually is built by a local agricultural improvement association with more or less aid from the government. Real interurban service could be supplied only by the government railway monopoly.

The commuter traffic of the larger German cities is now cared for either by special steam engines or by storage-battery cars. The present accumulator cars can run about 60 miles on one charge, but some to be built in the near future will have a radius of action of 100 miles. Gasoline-electric cars are also being tried. So far, however, the straight storage-battery service has proved the more reliable. The storage-battery cars are usually charged by a Diesel motor (oil engine) plant, which also serves for the station lighting at night.

The electrification of trunk lines has been taken in hand with thorough German conscientiousness by G. Wittfeld, of the Prussian railway ministry. Everything pertaining to heavy electric traction has been studied under his direction by a staff of picked men. Many of these men have received leave of absence from time to time to serve as commercial engineers in the large electric manufacturing companies. At the end of their furloughs they return to the service well acquainted with the facilities and viewpoints of the manufacturers. Of course, the companies are pleased to train the very men who will control the purchase, operation and maintenance of their apparatus. The government engineers are equally pleased to have this opportunity of securing a broader education than would be possible in the government service alone.

The Altona-Hamburg-Ohlsdorf, Oranienburg and Dessau-Bitterfeld lines are three places where the government has already installed electric trunk line equipment and has begun the education of men in its operation and maintenance. Formerly all repairs were made in the manufacturers' shops. Now the government's shops at Altona are so well equipped that all such work is done at home. In ordering electrical equipment hereafter the government does not intend to order a complete electric locomotive, but to ask for bids on so and so many motors, current collectors, transformers, trucks, etc. All assembling, therefore, will be done at the government shops. This policy naturally will involve a great deal of standardization, yet the time when this plan can be put into effect is not very far away. Beside the Allgemeine Company and the Siemens-Schuckert Company, there are smaller electrical firms of good standing, like Bergmann, Brown-Boveri and Maffei-Schwartzkopf, which naturally do not want to be sidetracked. The unit purchase system which the government contemplates will therefore favor competition by these smaller firms and enable the buyer to secure the lowest prices. At this writing the government is equipping 1 km (0.62 mile) of the Lauban-Königszelt trunk line in Silesia with three overhead systems of German manufacture. These experimental catenaries are being erected in a mountain district subject to heavy and violent snowstorms.

The breakdowns of many of the early American interurban a.c. railways seem to be a proof that the design of the motor had not been sufficiently developed when the lines were placed in operation. It is very likely that a more systematic development of the equipment, as well as of the men in charge of it, would have brought better results.

The apparent triumph in Italy of the three-phase system over the single-phase system shows how accidents can have as decisive an influence in technical matters as in political affairs. First of all, the Valtellina Railway is not an example of trunk line electrification, because it is too crooked for high speeds. Of course, low-speed service offers no current collection difficulties even with the two overhead wires required in three-phase operation. This is one reason also why the Giovi line operates satisfactorily. This line also consists of practically nothing but curves. It is one of the oldest steam railroads in Italy, and when it was built no one dreamed of the high-speed trains of this age. The present two ruling speeds of the locomotives are 12.8 m.p.h. and 25.6 m.p.h., but a difference in current-collecting difficulties will surely develop if an attempt is made to operate three-phase locomotives at 80 m.p.h. The return of current is very convenient on the Giovi line, since the electric braking on down grades has eliminated the jarring which is incident to mechanical braking. Of course, all the current generated is not returned to the line, as a great amount of the generated energy is wasted and worse than wasted in heating the motor coils. Hence, while there is a saving in brakeshoes, a high cost of renewing motor windings should be expected. The return of current to the line saves coal in the power station. Nevertheless, I have observed that the power factor drops so low (varying from 30 per cent to 60 per cent) that the high wattless current therefrom results in an enormous amount of heat in the generators. This can readily be detected by the bare hand when the generators, rated at 5500 kw, are running at peak loads of 1500 kw and average loads of about 1000 kw.

The Giovi line has a great reserve of electric locomotives which were originally ordered for other lines which are to be electrified. It should be clearly understood that the Simplon and Giovi lines became three-phase mainly because the three-phase Valtellina locomotives were available and because no manufacturer was willing at that time to risk the building of large single-phase locomotives. In short, the Italians were forced to employ the three-phase

Valtellina locomotives because they could not get any other type at that time.

TRUNK LINE ELECTRIFICATION AT THE NEW ENGLAND STREET RAILWAY CLUB

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on Jan. 25, with President Franklin Woodman in the chair. The speaker of the evening was W. S. Murray, electrical engineer of the New York, New Haven & Hartford Railroad, his subject being "The Electrification of Trunk-Line Railroads." Mr. Murray reviewed his early connection with the New Haven electrification problem, which resulted from a long-distance telephone call to a conference in 1905, at which the change to electricity was announced for the New York division. The engineering problem appealed to the speaker so much that he shortly gave up a consulting practice in Boston and has since devoted all his time to the epoch-making work of the company.

It appeared to Mr. Murray and his associates from the first that the success of trunk-line electrification for the New Haven conditions was bound up in the single-phase motor on account of the economies of energy transmission on a high-tension basis. The design of a suitable locomotive appeared to be the chief problem. All the other elements in the situation appeared to be pretty well determined by existing practice. Centralized power generation, transmission at potentials far in excess of the voltage proposed for the New Haven and single-phase motors of moderate size were all in use; but when the system was assembled numerous difficulties appeared in connection with the interoperation and commercial service of the parts. The unexpected troubles occurred in the combination of the old and familiar links. The least of the difficulties has been the single-phase motor, which is the backbone of the system. All the early troubles have now been overcome, but their history is still suggestive. To-day the company is securing runs of 20,000 miles per locomotive failure, every failure being counted as a delay of one minute's duration or over.

Mr. Murray said that the proper power for a trunk-line train in a 12 to 15-mile suburban service limited to such a zone is direct current. Such apparatus is lighter and more efficient than alternating-current equipment, but when suburban service is considered in connection with through service it is then a question of balancing factors in order to determine which system is preferable. Very heavy train schedules maintained over considerable distances call for the use of the a.c. system. The New Haven company has by no means abandoned direct-current service within its natural field of urban electric transportation. The cities lying along the main line between New York and New Haven are essentially direct-current propositions so far as their local traction service goes. This network of lines calls for the establishment of large a.c. centralized generating facilities with step-down substations and rotary converters transforming to direct current for trolley service. Mr. Murray then reviewed the well-known physical features of the New Haven electrification and pointed out that the capacity of the generating plant at Cos Cob is now being doubled in connection with the pending extension of electrification from Stamford to New Haven. Shortly 35,000 kw in generating machinery will be in service at Cos Cob. This plant at present operates at a poor load factor, and on account of its location near one end of the electric zone it does not meet the requirements of maximum economy of operation as it will when the entire passenger and freight service of the complete engine stage between Woodlawn, the Harlem River and New Haven is electrically operated. Articulation of local trolley loads and the demands of the main-line service upon the power plant will unquestionably result in great economies in time.

All signs point to the ultimate operation of the entire line between New York and Boston by the single-phase system. When the line is electrified to New Haven the Cos Cob station will handle all the traffic on about 550 miles of equivalent single track, including multiple-unit suburban trains, passenger express and local service, freight traffic and switching. The company's switching locomotives of electric type will handle the work required with about 33 per cent less capacity than the ordinary 600-hp to 700-hp steam switching locomotive; that is, six electric switchers will do the work of ten steam equipments. The speaker contended that the reliability of single-phase service is now thoroughly established and said that the railroads must shortly come to a decision as to the system of electric traction to adopt. Now is the time to select a standard system, for the problems of interchange in future service are bound to be of great importance.

Regarding electrification in the Boston district, Mr. Murray said that President Mellen desires to establish it if a proper working agreement can be arranged between the public and the company. The fundamentals of the situation are well understood, and it is now largely a matter of making the proper detailed arrangements. He commended the report of the majority of the Joint Commission on Metropolitan Improvements, which was submitted to the Legislature a year ago at Boston as the best expression of the electrification conditions which could be cited for Boston at the present time. Mr. Murray also gave a review of trunk-line electrification in Europe.

Answering several questions at the close of his address, Mr. Murray stated that the approximate all-day efficiency of the single-phase system now in service on the New Haven lines is about 75 to 80 per cent, from the power house to the electric locomotive driving wheel; this as compared with 65 to 70 per cent for the d.c. third-rail system. The all-day line efficiency is about 95 per cent. The efficiency of the transformers on the locomotives is about 95 per cent and that of the motors from 80 to 90 per cent. It is very difficult to increase the Cos Cob power station load factor above 30 per cent under present conditions, but it is expected that this will rise to 45 or 50 per cent when the freight locomotives go into service, through the filling of the valleys in the station load curve. The company has adopted the geared type of locomotive, with eight motors per unit, for freight service. A valuable operating point is the fact that the size of these motors is the same as is used on the multiple-unit suburban trains, which results in less diversity of apparatus, reduction in variety of spare parts and more effective maintenance. The motors have a nominal rating of 150 hp each, and on account of gage and clearance conditions the eight-motor locomotive is lighter than a four-motor equipment of the corresponding capacity. The company has found that by using eight motors per locomotive and 300 volts per motor the benefits of employing 600 volts per pair can be secured through series-parallel connections.

Short-circuits on the system are largely nullified by the use of impedance coils in the generator leads. These cut the current down to perhaps one-fourth of its original value, and as the mechanical strain is proportional to the square of the current the shock upon the generators is but one-sixteenth the value without the coils. A system of automatic relay switches is also used, which throws resistance into circuit for conditions of heavy abnormal current, immediately followed by the opening of the circuit-breaker nearest the short-circuited line section. Current is restored automatically to the balance of the system as soon as the line section which is in trouble is cut out by the opening of the breakers.

It is anounced from Berlin that the Cologne city authorities have made arrangements with two well-known German firms for the construction of an electrically operated high-speed railway between Cologne and Düsseldorf.

EXPERIENCE WITH SLOTTED COMMUTATORS ON RAILWAY MOTORS

BY F. J. FOOTE, MASTER MECHANIC OHIO ELECTRIC RAILWAY

Our company began to slot commutators about two years ago. Previous to that time we had a great deal of trouble from flat spots on commutators. A thorough system of inspection had not yet been inaugurated, and the presence of a flat commutator would often be indicated by the opening of the main circuit-breaker on the car when running at high speed. This action of the breaker is almost a positive indication of a flat commutator, since the actual working current required to operate the car is less at high speed than at low speeds or when starting the car. The flat spot causes the brushes to leave the commutator or "jump" at high speeds, and this in turn causes the current to flash over from brush to brush or to jump to the motor case. This flashing over caused the burning up of many brush holders and canvas armature hoods, the grounding of the commutators, injury to the field coils and excessive burning of the circuit breakers. The worst offenders were the GE-73 motors, of which we had about 136 in use under heavy service conditions.

REDUCTION OF MAINTENANCE TROUBLES

Just before the time that we began to slot the commutators we replaced about fifteen brush holders per month, at a cost of $7.50 each. Since this was done flat spots are almost unknown, and we do not average one burned brush holder per month. Our trouble with burned canvas heads has been greatly reduced, and our field trouble is about 10 per cent of what it was formerly. On the whole, it is safe to say that slotting the commutators has been responsible for reducing our total motor troubles at least 60 per cent.

THE RELATION BETWEEN SLOTTING AND SOFT BRUSHES

Many railway men do not seem fully to understand that soft carbon brushes must be used with slotted commutators. We have proved this fact by experience. We knew that soft brushes should be used with slotted commutators, but we had one style of armature whose commutator was still giving trouble from flats. As we had no soft brushes on hand that would fit it, we decided to slot one commutator and to try the old hard brushes. After this commutator had been in service for a few weeks we found that the hard brushes had been wearing away the commutator very rapidly. We were obliged, therefore, to discontinue the slotting of these commutators until suitable brushes were secured.

The converse of the proposition stated hereinbefore is also true, namely, that soft brushes are not suitable for use on unslotted commutators. An old motor, which was driving shop machinery, was sparking badly. The commutator had not been slotted, the mica between the bars being extra thick. We tried soft brushes on this commutator, but found that the mica wore out the brushes very rapidly and that the sparking increased, because the brushes were not hard enough to grind the mica even with the copper segments.

Very little trouble will be experienced with flat commutators, if a brush can be found that is just hard enough to keep the mica even with the copper. We had several GE-54 unslotted commutators for which the carbon brush that we were using seemed to be just right, as the commutator rarely showed any indication of high mica or flat spots. This condition, however, would be very difficult to secure and maintain in all cases. Even if it could be done the decreased wear of the commutator and brushes would more than offset the extra cost of the soft brushes and slotting.

In regard to the kind of brushes used, we have never found any brush quite equal to the French brushes, although American brushes nearly as good are now on the market, and in a short time, probably, the American brush will equal the best imported product. One trouble experienced with all makes of soft brushes, but not with the hard brushes, is the excessive wear on the flat faces, due to the abrasion of the brush holders. If the manufacturers of soft brushes can overcome this difficulty, a marked improvement will result. Now we often have to throw away brushes due to looseness in the holders, when otherwise they would be of service for several thousand miles more.

VARIOUS SLOTTING EXPERIENCES

We have tried several methods of slotting. Our first slotting was done on the lathe, using for a slotting tool a hack-saw blade about ½-in. long which was set into a piece of steel for a tool holder in the tool post of the lathe. The piece of saw blade was set in such a way that each of the six or eight teeth would cut its share of the mica. A number of commutators were slotted with this device, but it was found that the teeth clogged up very easily.

We next rigged up on our banding machine a circular saw of 1-in. diameter with about sixteen teeth. This saw was mounted on an arbor and driven by a small round belt at about 1500 r.p.m. from a motor suspended from the shop ceiling. The headstock carrying this arbor was mounted on a slide and operated with a hand lever. Arrangements were provided for the vertical adjustment of the saw. This contrivance worked fairly well and was used several months. We found, however, that it was necessary to have a saw that would clean out all of the mica, since if any was left in the sides of the slots it would not break out but would remain in place and cause flat spots. In other words, we were obliged to have several widths of saw to match the various commutators. We also found that the saw would raise a small "burr" that sandpaper would not remove, and the armature had to be put back in the lathe for a very light cut.

We cut the slots a scant 1/16 in. deep. When any repairs are made on commutators it is usually necessary to turn them down to some extent before slotting. As our facilities for handling heavy armatures are not the best, we finally concluded to do the slotting in the lathe, using in the tool post a tool which is just wide enough to remove all of the mica and no copper. In this way the preliminary turning, the slotting and the final light cut can all be made without removing the armature from the lathe, thus saving much time.

Considerable skill is required to get the finishing cut just right. We find that it is necessary to keep the tool very sharp and keen, whetting it often with a small oilstone. If this is not done there is a tendency to drag the copper into the open slots. Our machinist keeps a tool exclusively for this work. We run the commutator at a high speed when turning, and the whole operation of taking the finishing cut after slotting requires about five minutes. No sandpaper is used. It is necessary to go over the commutator with a small hook, made of an old hack-saw blade, so as to pick out any particles of copper that may have lodged in the slots. Our machinist's regular time for doing this work, that is, taking the preliminary cut, slotting, taking the finishing cut and going over the commutator for burrs, is forty-five minutes for a GE-73 bar commutator and one hour for a Westinghouse No. 121, 205-bar commutator. The tool used for slotting is a single point, set well forward and having a large rake.

We find the method last described to be the most satisfactory of all yet tried by us.

According to an interesting table showing the relative speeds attained on the various French railways, the Compagnie du Nord holds all the records. The Est, Paris-Lyon-Mediterranée, and other companies come after. The maximum commercial speed realized by the Nord trains, including coaches of all classes, first and second class only, and first class and "du luxe" only, varies from 50 m.p.h. to 55 m.p.h., but the "rapides" often exceed this speed. The regulations permit a speed of 75 m.p.h. on the main lines.

HEATING STORAGE BATTERY CARS

The Third Avenue Railroad Company, New York, which is operating eighty-two storage battery cars, has recently equipped them with a forced-draft ventilating stove which is installed under the car floor. One of the accompanying views shows the installation on the truck. As these cars are of the single-truck type, they permit a light and solid

Stove on Truck of Storage Battery Car

method of hanging the stove. The stove itself is very small. It has no smokestack leading up through the car, since the burned gases are discharged at the street level in a horizontal plane.

The operation of the stove is similar to that of the Howden draft system for boiler rooms on ships where the boiler room itself is under an air pressure of a few ounces per square inch above that of the atmosphere. Hence, upon opening the dampers below the grate line the air under pressure rushes up through the firepot out of the stack, giving a forced draft with very efficient combustion and even distribution of fire.

The stove is placed in a heat-proof metal casing into which air is blown by a multi-vane type of fan and motor. Some of this air passes through a small hole below the grate line up through the fire. From the top of the combustion chamber it is led down in a separate pipe and out

Outlets Under Seats for Air Heated by Truck Stove

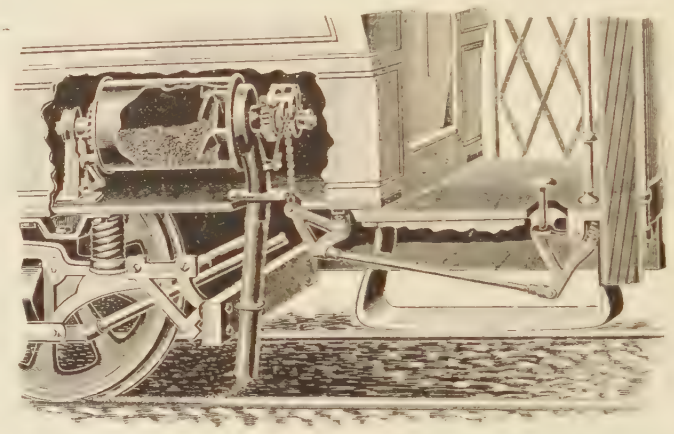
at the street level. The main current of heated air passes out at the top of the stove through openings under the seats, as shown in the view of the exterior.

Should the motor stop, the fire, losing its draft, will be extinguished. This condition prevents serious overheating with the attendant fire risk. Furthermore, if the motor should stop, natural circulation will allow the heated air to pass on into the car body, as there are no heat pockets. The grate area and heating surface of this stove are so proportioned that it will burn from three to four hours without any filling. About 25 lb. of coal are required in a twelve-hour day for effectual heating.

If desired the stove could be placed in the vestibule of single-end cars, where it would make a very neat installation on account of the absence of a roof stack. This stove is built by the Consolidated Car Heating Company.

NEW TYPE OF SANDER

The accompanying illustration shows the Sprague rotary sander which is made by the Albert & J. M. Anderson Manufacturing Company. This sander is of cylindrical form, with iron ends and a galvanized-steel wall. It is mounted on standards which are fastened to the car floor. The container with its contents is revolved, and its action is positive and subject at all times to the will of the motorman, who controls the flow of sand by foot pressure. There are seven buckets, which, as the box is turned, take up the



Rotary Sander

sand and deposit it through open portholes in the spout. The opening for filling the box consists of an iron-hinged door, which when closed is locked securely in position by means of an eccentric. No tools of any kind are required to open or close the container. The sander may be installed near the car heaters so that the sand will be kept dry. Should the sand freeze when the car is stored the rotary motion of the box will quickly release the mass and break it up.

SUCCESSFUL OPERATION OF TURNSTILES AT A DELAWARE PARK

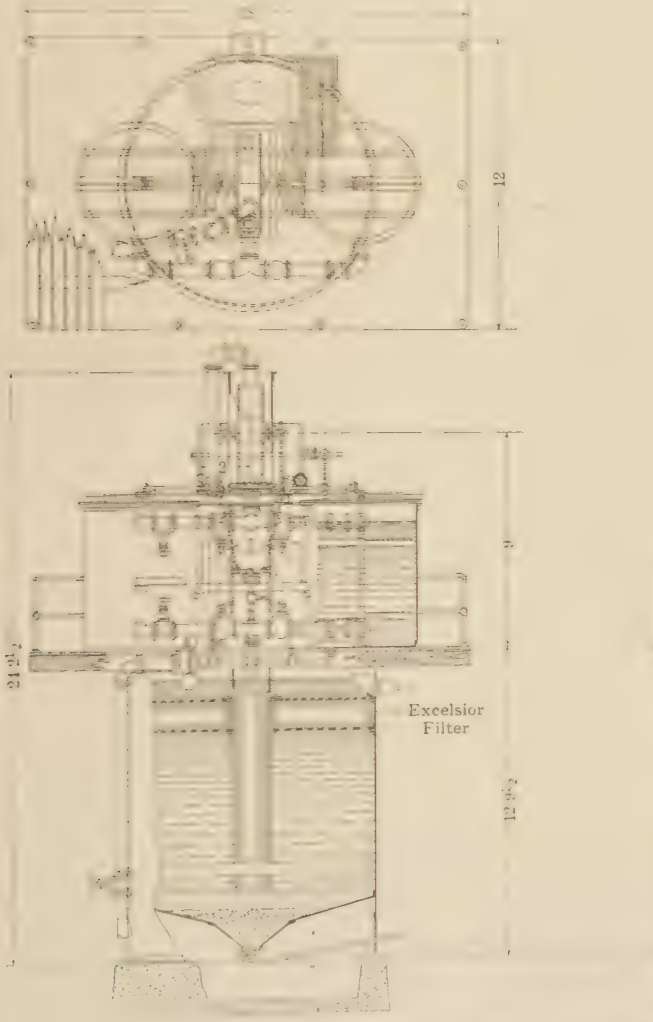
The People's Railway, Wilmington, Del., operates a park at Brandywine Springs, which draws its attendance from the city of Wilmington and pleasure-boat traffic from the surrounding country. Either trip involves a considerable haul, so that the fare which is paid for transportation to the park includes general admission to the grounds. Until last season the return fare was paid on the cars. It was clear, however, that owing to the congestion of traffic at the park exit and the consequent crowding of the cars many fares were lost. To eliminate these losses the management decided to install a turnstile and fare-box system as hereinafter described.

Registering turnstiles were placed at the entrance of the park to count the traffic from the cars into the park. Of course, no money was collected at this gate, but the registration thus effected served as a check against the fare receipts to the park. Registering turnstiles were also installed in conjunction with an automatic fare box at the park exit, where the return fare was collected and registered. These two counterchecks have proved very useful.

The special two-arm turnstiles and the automatic fare box manufactured by the H. R. Langslow Company, Rochester, N. Y., were selected for the service described. They were in constant use during the past summer, handling on Sundays, the busiest day, from 8000 to 10,000 people, or an average of from 4000 to 5000 persons per stile. R. W. Crook, general manager of the railway, states that the public soon became acquainted with the system, although there was a little inconvenience at first.

THE LORD WATER SOFTENER

The accompanying illustrations show sections and a plan of a new type of automatic water softener or purifier recently put on the market by the George W. Lord Company, Philadelphia. The water enters through the inlet pipe and passes over a water wheel, which furnishes the power for the operation of the filter. The shaft supporting this wheel is connected by a chain drive with a horizontal shaft above the two mixing tanks, which in turn are connected by miter gears with two vertical shafts equipped with paddles for agitating the water in the mixing tanks, thus aiding the precipitation of the injurious solids. This water wheel also drives paddles in a chemical storage tank, which continually agitates the solution of chemicals so as to keep them of a uniform consistency and strength. These purifiers are also equipped with chemical measuring valves to regulate the amount of chemicals used from time to time. These valves are operated by a dumping bucket which also opens and closes a series of lower valves at proper intervals, thus giving an automatic action.



Section, Elevation and Plan of Water Softener

After the water leaves the water wheel it enters the upper line of a pipe and flows first to the right and then to the left. The flow is regulated by the lever valves referred to, which are connected with the inflow and the outflow pipes.

For example, the water first passes through the pipe leading into the right-hand mixing tank, until this tank is completely filled. After this a sufficient amount of water overflows through a pipe in the upper part of the tank into the dumping bucket, which tilts and closes one upper valve and opens the lower valve directly underneath, thus allowing the water to flow from the mixing tank and to enter the main filter tank of the purifier. This action is then repeated in the left-hand tank and continues indefinitely until the storage tank is filled.

After the agitation is completed the water next flows through a center partition or cylinder into the main filter tank, which separates the raw water from the treated water, and after this it flows upward through the filters and overflows into the storage tank at the side or directly into the boilers.

The precipitates in the meantime settle into the funnel-shaped base of the filter tank. Some of the precipitates may be carried up a slight distance, but being of a heavy nature the tendency is to settle, and on the downward flow they naturally come in contact with other particles rising and unite with them, causing same to fall to the base of the purifier. They are then removed through a sludge valve intended to convey the sludge or impurities into the sewer. The filters remove any remaining trace of precipitates, the result being a perfectly pure water suitable for all manufacturing or industrial purposes.

The plan shows the chemical measuring valve, which holds a definite amount of the reagents furnished for precipitating the injurious solids. This valve is equipped with an inner measuring cup and brass sleeve on the outside cover, which this cup slides back and forth. The cup has an opening at the bottom and a small opening or air vent at the top, which allows the air to pass in and out at proper intervals. The valve is operated by a dumping bucket, as it tilts back and forth. This causes the opening in the inner cup to rotate back and forth so as to come directly in contact with the two ports on the right and left, one of which is connected with the chemical storage tank and the other with the mixing tank. By this means the measuring valve may be filled and emptied at regular intervals by an entirely automatic action and a definite amount of chemical solution fed into the mixing tank at regular intervals.

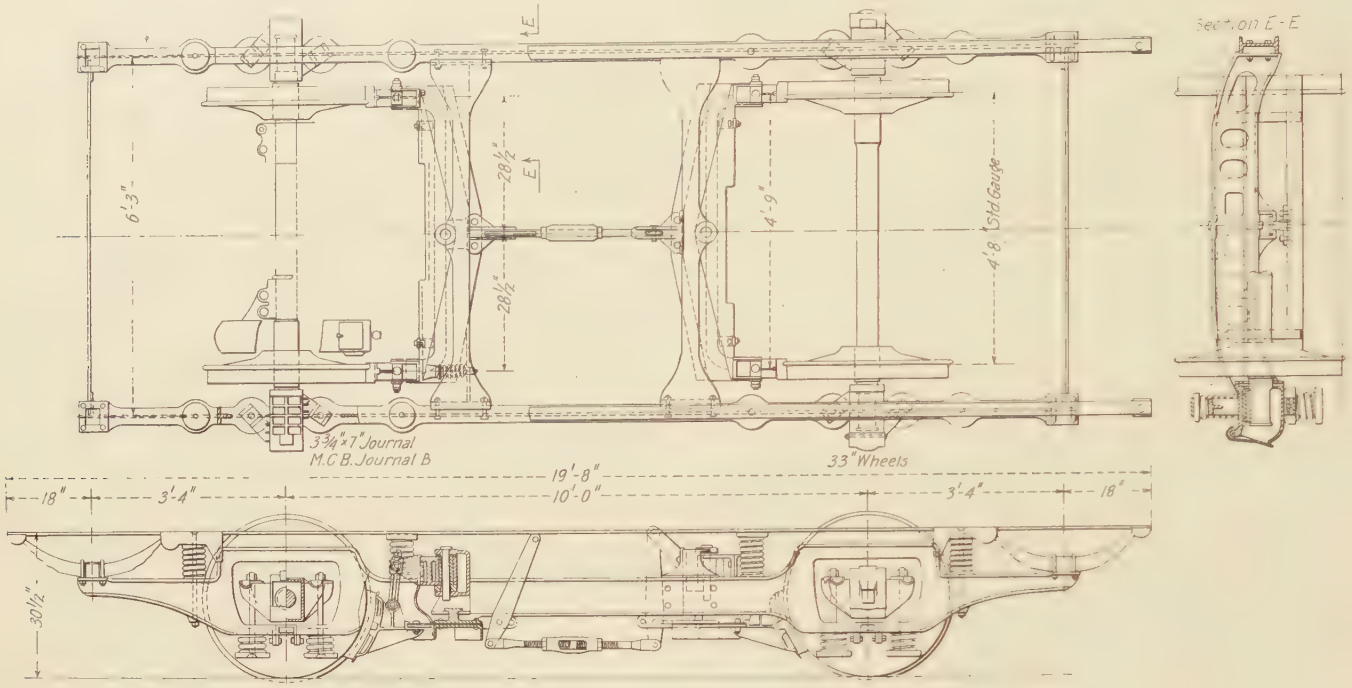
The water softener was intended for the cold-water treatment of feed waters, especially those in use along railroads and in industrial plants where a large battery of boilers is required or where a water highly concentrated with injurious solids is being used.

Moving stairways have been installed recently in a number of the underground stations of London, Eng. Four moving stairways, two down and two up, with a combined carrying capacity of 20,000 people per hour, are to link the Liverpool Street station and the Broad Street station with the Central London tube station, which is now being constructed below the two railway termini.

NON-PARALLEL-AXLE TRUCK AT DAYTON, OHIO

The City Railway Company, of Dayton, Ohio, has operated for several months a car mounted on the Warner non-parallel-axle truck. The noteworthy features of this equipment are the long wheelbase of the truck, 10 ft., the flexibility of the axle mounting and the exceptionally large Car Company for ten 26-ft. 6-in. car bodies mounted on 12-ft. wheelbase Warner non-parallel-axle trucks.

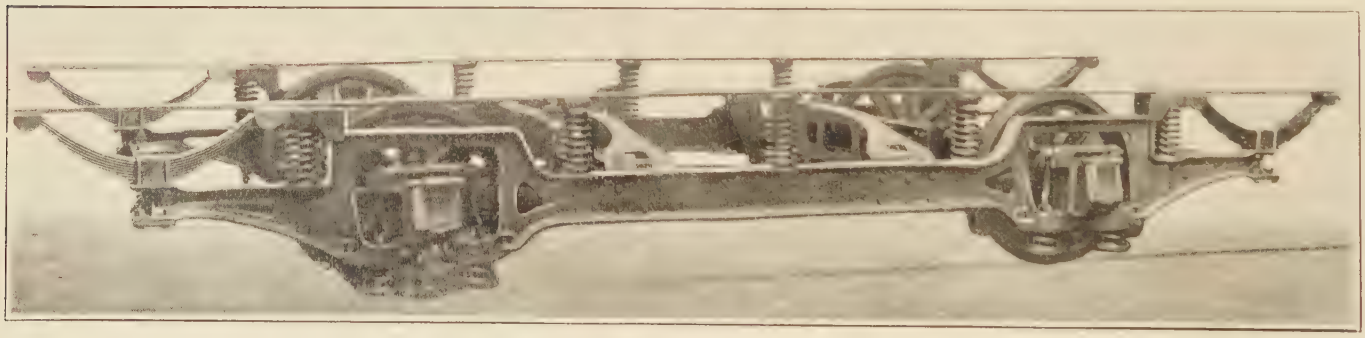
The Warner truck, as illustrated, is designed to afford great flexibility with a long wheelbase which can safely carry a car body of considerably greater length than that now customarily mounted on a rigid single-truck running gear. In fact, the Dayton car bodies are practically as



Plan and Elevations of Non-Parallel-Axle Truck

body which is being successfully carried by the new type of truck. The car body, as will be noted by the illustrations, is designed for the pay-within method of fare collection, has an arch roof and otherwise conforms to the railway company's double-truck car design. The body seats forty passengers, and the car and trucks, complete with two GE-67 motors, K-2 control, National air brakes with A-4 compressors and a Cooper steel hot-water heater, weigh 27,000 lb. The doors have folding steps and are operated by the pay-within air mechanism. Ventilation is provided by eight exhaust ventilators on the roof connecting with the interior of the car body through register openings. The car body has a generous amount of standing room and is designed for single-end operation.

The Warner non-parallel-axle truck which carries this long as those which ordinarily would be mounted on two trucks. The notable feature of the Warner truck is the method of connecting the axles with the cast-steel side frames for affording flexibility with the long wheelbase. Substantial brackets are cast integral with the journal boxes, and the side frames are supported from the same brackets through the medium of two coil springs and hangers at each journal box. This arrangement provides for movement of the car axle in a horizontal plane, the extent of the movement being determined by the radius of the curve around which the truck may be passing. Thus the flange friction is largely avoided because the two axles of the truck assume a converging position and permit the wheels to roll freely around the curve rather than bind against the guard rails.



Side View of Non-Parallel-Axle Truck

car body was manufactured by the St. Louis Car Company, which has the United States rights for the manufacture and sale of this type of long-wheelbase flexible single truck. The car body was built by the Cincinnati Car Company. The success of the Warner truck on the City Railway at Dayton has resulted in the People's Railway Company, of Dayton, placing an order with the St. Louis

The side frames, cross bars and motor suspensions are made of cast steel, the side frames having an I-beam section. Each truck has four semi-elliptic springs, eight swing-link hanger coil springs and eight top-bar coil springs. Lateral swing of the yokes supporting the motors is controlled by four small buffer springs, each placed back of the brake hanger bracket on the motor suspension bar and ar-

ranged to buff against buffing pieces attached to the cross bars.

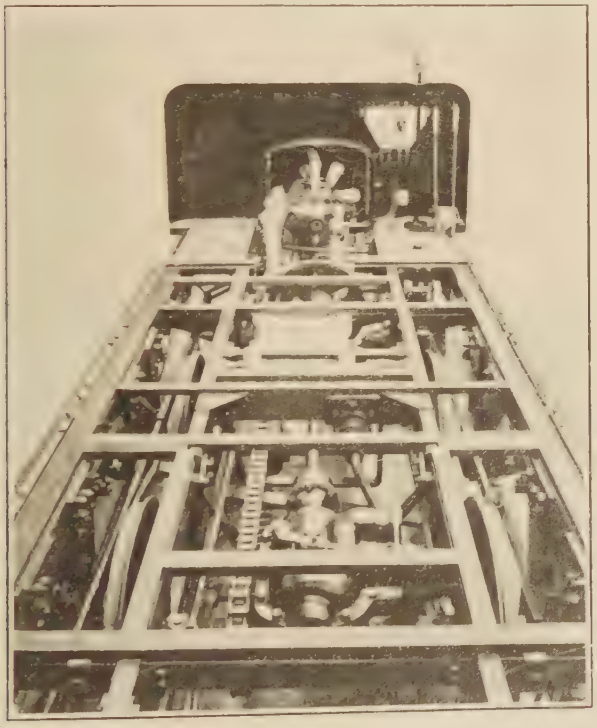
T. E. Howell, general superintendent of the Dayton City Railway Company, states that the operation in Dayton of

Car Equipped with Non-Parallel-Axle Truck

the car mounted on the Warner truck has been successful, not only from the viewpoint of demonstrating easy riding qualities but because of measurable economies in power consumption owing to the reduced flange friction.

ENGLISH GASOLINE-ELECTRIC CAR

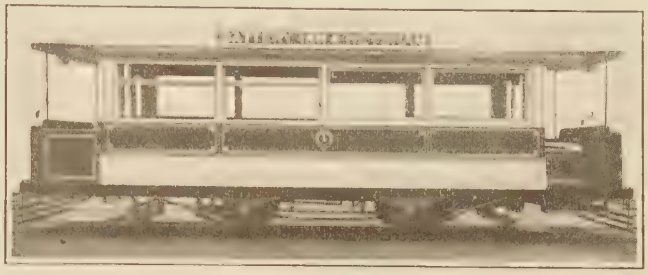
The Morecambe (Eng.) Tramways have recently placed in operation what is believed to be England's first gasoline car for street service. As shown in the accompanying view, this car presents the usual appearance of English single-deck designs except that the radiator is fixed to the dash. The Morecambe car seats thirty-seven passengers, is 31 ft.



Gasoline Equipment on Platform and Truck of Morecambe Car

long over the fenders, 7 ft. 7 in. wide, 8 ft. wheelbase, and weighs 16,240 lb. complete with all equipment.

The gas engine is rated at 55 hp. Its speed is controlled by means of a lever working on a rack concentric with the direction wheel and operating on the throttle valve. The spark-advance lever is also similarly situated. An accelerator pedal, which acts on the throttle, is installed for the more rapid, though necessarily less fine, adjustments called for by the traffic. The engine has the usual high-tension magneto ignition and a Zenith carburetor. The water-circulating pipes of the radiator are so large that should the pump fail the engine could still be run at reduced power by natural circulation alone. The draft through the radiator is maintained by an aluminum fan, which is mounted directly on the crankshaft. The clutch is also of aluminum.



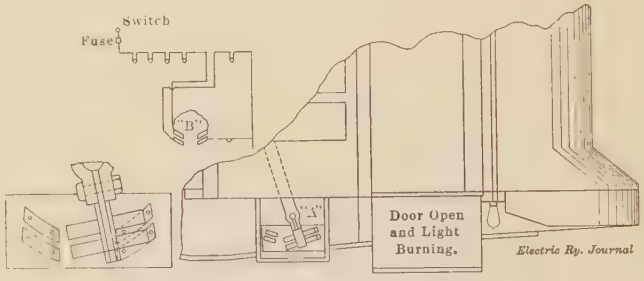
Gasoline Car for Morecambe, Eng.

The change gear box gives four changes of speed in the forward direction and one reverse. The ratios of the gearing are for 12 m.p.h., 9 m.p.h., 6 m.p.h. and 3.3 m.p.h. at an engine speed of 850 r.p.m. and with 30-in. driving wheels. The gear ratios are changed by means of levers. The transmission from this gear box to the gear case on one of the axles is made through universal joints. The two axles are connected by a roller chain.

This equipment was built by Leyland Motors, Ltd., Leyland, Lancashire. The car body was furnished by the United Car Company, Limited, Preston.

STEP-LIGHTING DEVICE FOR SAGINAW PREPAYMENT CARS

The Saginaw-Bay City (Mich.) Railway has recently equipped its prepayment cars with an automatic step-lighting arrangement invented by L. A. Gaw, master mechanic. The purpose of this illumination is to enable alighting passengers to see the condition of the pavement below the step, especially at street crossings without arc lights. This



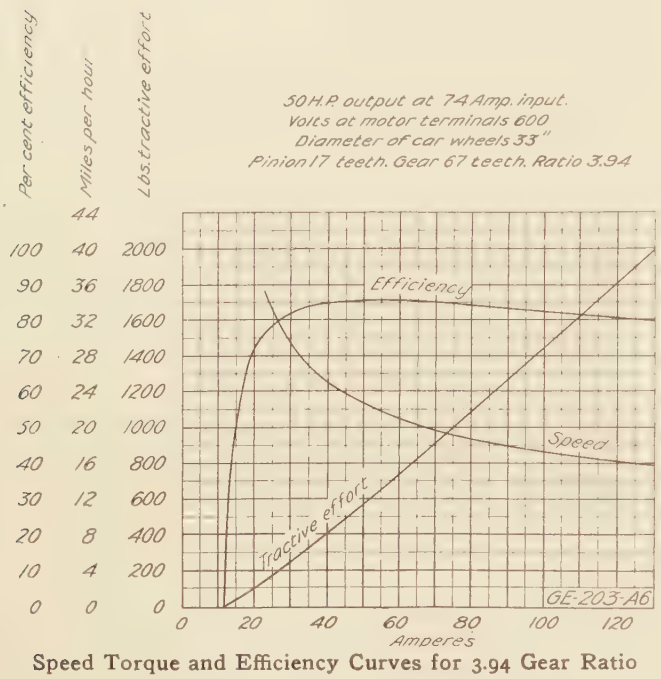
Circuit for Step-Lighting Arrangement

company's double-end prepayment cars have the usual incandescent lamp beneath the roof on the entrance side but none on the exit side. Under the new arrangement the same lever with which the motorman opens the exit door serves to close a bottom contact, thereby throwing off the roof lamp and throwing in a lamp placed alongside the exit step, as illustrated in the accompanying drawing. The step lamp is cut out of the circuit and the other lamp is cut into the circuit when the exit door is closed.

The Brooklyn Rapid Transit Company submitted to the Public Service Commission on Feb. 1 its agreement to give a 5-cent rate to residents of the Coney Island section on business days between the hours of 6 and 9 a. m. and 4 and 7 p. m., as an experiment, beginning next May 15 and ending next Sept. 15. It provides that round-trip tickets, good during the hours named, but not on Sundays or holidays, will be issued for 10 cents. It was announced that the concession would go into effect on March 1, 1912.

A NEW LIGHT-WEIGHT MOTOR

Further data have been made available on the GE-203A light-weight commutating-pole motor since W. D. Sargent presented a description of it at the January meeting of the Central Electric Railway Association, as noted in the Electric Railway Journal for Jan. 20. The most striking feature of this motor, aside from the improvements in material and construction, is the system of self-contained



Speed Torque and Efficiency Curves for 3.94 Gear Ratio

ventilation which is illustrated in the accompanying cut. Air is circulated over the armature and field coils, under and through the commutator and then through longitudinal holes in the armature core. This is accomplished by a centrifugal fan which is made integral with the pinion and armature core head. This fan forces the air over the foregoing parts and exhausts it to the motor exterior through openings in the pinion and bearing head. Fresh air is drawn into the motor through a screened and baffled opening on the upper side of the motor at the pinion end. By this means the heat in the motor is rapidly dissipated, and all parts of the motor are maintained at an unusually uniform temperature.

With a completely inclosed motor and no external ventilation, the motor will perform a service similar to ordinary standard motors of the same hourly rating but of much greater weight. A four-motor equipment run closed in interurban service on 600 volts will handle a car weighing 24 tons, at 22½ m.p.h. with one stop per mile. With external ventilation it will handle a car weighing 34 tons in the same service with the same temperature rise. In general, a GE-203 four-motor equipment, with a total weight in motors of approximately 8600 lb., can do the same service as an ordinary unventilated four-motor equipment with motors weighing approximately 12,400 lb.

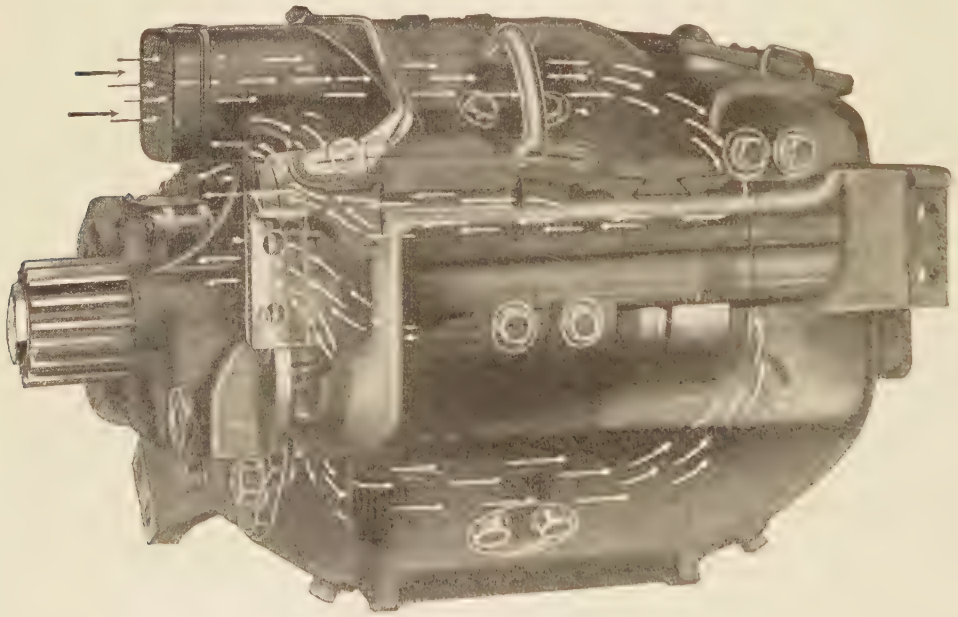
The schedule of weights under different conditions is as follows: Motor complete with gear and gear case, 2150 lb.; two-motor equipments complete with two controllers, 5540 lb.; two-motor equipments complete with type M control, 6400 lb.; four-motor equipments with two controllers, 10,270 lb.; four-motor equipments complete with type M control, 10,975 lb.

ENGLISH CIRCUIT BREAKERS

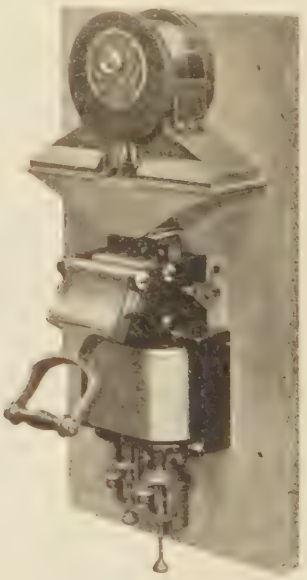
The metallic shield blow-out principle of the circuit breakers made by Dick, Kerr & Company, Ltd., London, Eng., is now being widely used for such heavy currents as 3000 amp and upward. In all of these breakers the solenoid coil is placed in a casing of copper or other non-magnetic material so that it can thus be brought directly into the sweep of the arc. The external magnetic field created around the shield of non-magnetic metal attracts the arc to the shield and divides it in two, one arc going from the contact piece to the shield and the other from the shield to the finger. These two arcs travel rapidly in opposite directions on the copper shield, and finally unite again in the air but around the coil and shield. At this stage the arc has become attenuated to such an extent as to rupture.

The windings of the blowout are of annealed copper, wound on magnetic cast steel, with asbestos insulation between the turns and amber mica on the core. The calibration range is adjusted by means of an insulating screw which is self-locking at every quarter turn.

The breaker is closed by pulling down the handle until it engages with a trigger, causing the brush by means of links to lift and press squarely against the flat parallel copper blocks. The latter are fitted with renewable faces



Ventilation Scheme for GE-203a Motor

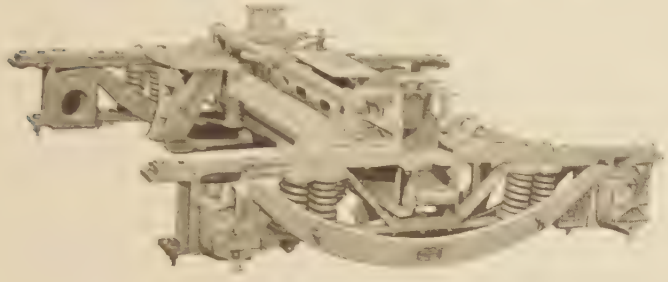


4000-Amp Circuit Breaker

although the wear is slight. The use of heavy wrought copper punchings for the sparking tips gives a reliable low resistance shunt to the main brush contacts, and avoids the injurious sparking which results from high resistance auxiliary contacts. A most important feature of these breakers is the interchangeability of all wearing parts.

LIGHT-WEIGHT INTERURBAN TRUCK

The Baldwin Locomotive Works, Philadelphia, Pa., have designed an equalized type truck for interurban service which is of exceptionally light weight for its carrying capacity. Six trucks of this type were recently built for the Gary & Southern Traction Company. They will support a maximum center plate load of 19,800 lb. and without wheels or axles weigh only 3450 lb. No end frames are



Light-Weight Interurban Truck

used, as the side frames are kept square by the substantial cast-steel transom gusset plates. These gussets also form solid anchorage for the brake hangers and thus prevent chattering of the brakes.

The pedestals, which are bolted to the bar side frames, are fitted with removable shims which are easily replaced when worn. A straight tie bar connects the bottom of the inside pedestals. It is fastened to each pedestal by two tapered bolts so that the bolts resist shear only and the tie bar itself is in simple tension. The most original feature of the design is the use of curved equalizing beams. These beams are ⅞ in thick, 4½ deep at the center and 2½ in. deep over the journal boxes. They are bent at the center in a perfect arc of a circle to a radius of 48¾ in. and at the ends are bent on a gradual curve which does not upset the fibers of the metal. An equalizing beam of the ordinary shape has practically two right-angle bends at each end and these bends cause the inside fibers to compress and the outside fibers to stretch, thus causing internal stresses which may bring about a failure. The shape of the beams used in this new truck is such that the fibers are not stressed in forging and a lighter section, therefore, may be used. Two equalizer springs are used at each end of the beams. These rest on a centrally pivoted spring seat between the inside and outside equalizing beams.

LOCOMOTIVE SNOW PLOW IN UTAH

The Ogden Rapid Transit Company, which operates between Ogden and Brigham in Utah, had considerable trouble during the winter of 1910-1911 from snow blockades. The light snow plows and cars were derailed by the heavy snow and it was found practically impossible to remove drifts, 300 ft. to 400 ft. long and from 1 ft. to 6 ft. deep, which were piled up on the tracks by the severe winds. To avoid a repetition of these unpleasant experiences, the company decided to build snow plows and attach them to a 30-ton electric locomotive which had been purchased in 1910 from the St. Louis Car Company. As this locomotive was equipped with four GE-210 interpole motors it was considered of ample capacity for this emergency service. The total cost of the installed plows, as hereinafter described, was about $450, an expenditure which has been fully justified by the excellent work which they have done in reducing the cost of effective snow removal.

The snow plow is made entirely of steel, the frame being built of 1-in. x 6-in. mild steel, triangular in shape, with sides 7 ft. 6 in. x 5 ft. 3 in. x 5 ft. 3 in. The wings of the plow are made of ⅜-in. x 48-in. tank steel and are curved to a radius of 12 in. at the top and bottom of the plate. The ⅜-in. x 6-in. strips of plow steel, which are riveted to the bottom of the wings, take all the wear. These strips can easily be replaced when worn out. The wings are secured to the frame with three-part forged hinges, which are riveted to the frame and wings. The wings extend only 4 in. below the frame.

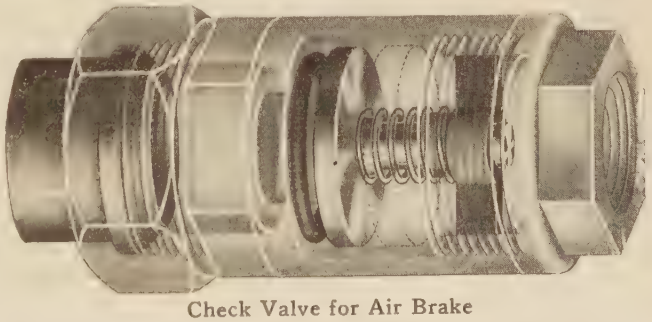
The width of the plow is 9 ft. On the rear corners of the frame are bolted castings which are cored out so as to fit over the ball of a 60-lb. rail. Two pieces of this rail are bolted and braced vertically to the end sill of the locomotive. These rails prevent the plow from moving laterally, but allow it to be raised and lowered a distance of 12 in. by means of compressed air. The air cylinder for the plow is supported on two pieces of 48-lb. rail which extend out over the locomotive end sill. The motorman can operate the plow from the locomotive cab and raise it to any desired height and hold it in position by means of dogs which engage in two ratchets on the cylinder. The same engineer's valve operates both plows, each one being cut out or cut in by means of two cut-out cocks between the engineer's valve and cylinders.

In connection with the operation of this plow it should be said that where the plow is lowered into working position and is allowed to run on top of the rails all dirt, snow and ice is cleared off, thus leaving a clean track behind it. The company advises the removal of all plank crossings and also the grinding off of all frogs and switches so that it will not be necessary to raise the plow when it passes over them. The company is doing this now on all of its new work.

CHECK VALVES FOR AIR BRAKES

The "Peerless" check valve shown in the accompanying illustration is made by the Trolley Supply Company, Canton, Ohio, for air-brake cars to prevent the leakage of air back through the compressor after the tank has been pumped to its capacity.

Without the valve, when the compressor has pumped the pressure, say, to 80 lb. or 90 lb., an equivalent back pressure exists against the piston head, cylinder and cylinder ring; likewise, when the pressure has dropped to 60 lb. and the governor has started the compressor, there is 60 lb. back pressure at the start. However, if this check valve is placed in the air line close to the reservoir, the pipe between the valve and the compressor is empty. Consequently, the compressor is already going when the governor



Check Valve for Air Brake

cuts in at the 60 lb. load. It has also been found that with the valve in the line the air pressure will drop from 80 lb. or 90 lb. to 60 lb. about one-third as fast as when no check valve is installed. This test showed that 75 per cent of the air leakage occurs back through the cylinder. This check valve is made in 1-in. and ¾-in. sizes.

LONDON LETTER

(From Our Regular Correspondent)

The London United Tramways has deposited a bill in Parliament which is intended to settle the company's disputes with the Corporation of Richmond in regard to the existing tramway in Kew Road. This line is still operated by horses, though the company obtained power to electrify it in 1902. The Richmond Corporation has power to purchase the tramways in the borough, but has deferred the purchase and has not permitted the company to adopt the overhead system. The company finds it impracticable to electrify the line unless it is permitted to work it by the overhead trolley and make it part of its general system. The present bill requests the Corporation to exercise its powers of purchase or agree to the adoption of the overhead system. In the event of neither alternative being adopted the company desires to be allowed to abandon and remove the Kew Road line.

A short bill will probably be introduced in the next Parliament to obtain powers for trackless trolley schemes more cheaply and easily than at present by placing them under the ordinary light railway procedure. A number of bills for trackless trolleys are before Parliament, but others have doubtless been deferred in anticipation of action on the part of the government regarding this question. In the meantime, there is a controversy between the advocates of trackless trolleys and the advocates of petrol omnibuses, precipitated by the success of these 'buses in London. Petrol-electric omnibuses are also being advocated. Petrol 'buses have proved formidable competitors to the London County Council tramways, but the streets of London are peculiarly adapted to vehicles of this kind, being paved with wood or asphalt. Again, most of the London County Council tramways are operated on the conduit system, the capital expenditure for which is about twice the amount necessary for the overhead system.

There was a serious tramway accident recently at Accrington, where the cars are operated on the regenerative control system. The Board of Trade inspector has reported that this system is not suitable for hilly routes. The cars are operated by the Rawtenstall Council, which paid about £100 extra per car to secure the advantage of saving current when the cars were running down hill.

A considerable number of bills for traction schemes will come before Parliament in the next session. The Birmingham Corporation will ask for power to borrow £200,000 for new tramways; the London County Council desires nearly £400,000; Sheffield Corporation, £200,000; Glasgow Corporation, £200,000, and a number of the smaller corporations sums of from £20,000 to £30,000. These sums are to be used for extensions and represent practically no new enterprises.

The Roads Improvement Association in its investigation of the traffic problems of London has complained to the Board of Trade that the London County Council tramways seriously impede other traffic. The association contends that the Council runs too many cars during the middle of the day and that serious congestion is caused at junctions. As to the unnecessary number of cars, the association has pointed out that in the City Road 950 cars pass between noon and 6 p. m. It suggests the withdrawal of the supernumerary cars during these slack hours. To do this would undoubtedly tend to rupture the strained relations between the London County Council and its employees.

The Underground Electric Railways, London, has announced that it has definitely decided to proceed with the extension of the Hampstead Tube to Edgware. This tube comes to the surface near Golder's Green, the present terminus, and that station is elevated above the adjoining roads. The extension will therefore not be in a tube, but above the surface like an ordinary railway. The company obtained Parliamentary powers for this extension in 1909, but as these have lapsed a new bill will be required.

The Leeds Corporation has for years had separate power stations for tramway and electric lighting purposes. Efforts, however, are being made to produce all the current which is necessary at one central station. The members of the City Council are at variance on this question, but the electric light department is assisting the tramway department by furnishing three-phase 6600-volt current from its station to a rotary converter in one of the substations of the tramway department.

In the report of the East London Railway which was issued recently reference is made to the electrification of the railway. A survey has been made by the engineers of the Metropolitan, Metropolitan District and South Eastern Companies and specifications and drawings have been completed for the substation machinery and equipment. It is proposed to obtain current from the Metropolitan District Company's power house at Lots Road and distribute it through the existing substation at Whitechapel and a new substation which it is proposed to build at Deptford.

The Newcastle tramways committee has been investigating the subject of the protection of its drivers and has installed as an experiment a new car with vestibules which cost about £30 more than the ordinary type of car. Statistics presented at a recent committee meeting show that more than 8000 electric cars are run in this country, and of these 223 cars had vestibules. The vestibuled cars were distributed among nineteen towns. In eight of these towns the authorities considered the vestibules an advantage, while an equal number considered them a disadvantage. The remaining towns did not express any opinion. The men employed on these cars in ten towns favored the vestibules; those in four of the towns condemned them and the men in the other towns did not express any opinion.

Work on the light electric railway between Southend and Burnham-on-Crouch is to be started shortly. The powers for the extension to Colchester have been allowed to lapse. Current is to be supplied by the Southend Corporation as far as Rochford, to which point the corporation will have running powers in connection with its tramway system. The track is to be similar in construction to the Southend tramways, but ferro-concrete sleepers are to be used across country.

Charles Rivers Wilson and Charles W. Fremantle have resigned from the board of the British Electric Traction Company.

At the annual gathering of the Edinburgh tramway employees statistics were given by the chairman of the company in regard to the cables which are used in Edinburgh. These cables vary in length. The longest cable is 33,600 ft. and the shortest 4500 ft. The total length of cable is 293,000 ft. The initial cost is £10,000 each year, but when upkeep and repairs are taken into account the total cost is about £17,000 per annum. The life of the cables varies according to the route on which they are running. The actual average life is 267 days. The company has an equable arrangement with the makers of the cables. The length of time that a cable should remain in service is known, and if the cable fails to give the proper service the maker is penalized. If the cable remains in service longer than was expected the company is paid for the additional service.

As stated in the Electric Railway Journal of Jan. 27, 1912, the provisional terms of the amalgamation of the Underground Electric Railways and the London General Omnibus Company have been announced. A general meeting of the holders of the income bonds of the Underground Electric Railways has been called for Feb. 22 to consider a scheme dated Jan. 18 for the acquisition by this company of the ordinary stock of the London General Omnibus Company, Ltd.

The Underground Electric Railways, London, has declared a dividend at the rate of 2 per cent per annum on its 6 per cent income bonds for the half year ended Dec. 31, 1911, payable March 1. This is the second increase in the rate within a year. There are $25,000,000 of the income bonds outstanding, of which a considerable amount is held in America. Holders of the company's 5 per cent notes, which fell due in June, 1908, exchanged them at the rate of 40 per cent of their holdings for the company's 4½ per cent mortgage bonds, and received also 70 per cent of their holdings in the income bonds on which the 2 per cent rate has now been declared. These income bonds are to share up to 6 per cent in the earnings of the system after the requirements of the 4½ per cent mortgage bonds have been taken care of. Interest at the rate of 1 per cent was paid on these income bonds for the calendar year 1910. This was increased to 1½ per cent for the first half of 1911, and the rate is now again increased.

A. C. S.

News of Electric Railways

Improvements in Cleveland Before the Council

At the recent meeting of the City Council of Cleveland the people who use the Bridge Avenue line proposed that they should be permitted to vote on the question of looping the cars of the Cleveland Railway by way of East Ninth street. Action on the resolution providing for this vote was postponed indefinitely by the committee.

Several councilmen have been endeavoring to have a portion of the proceeds of $2,500,000 from the bond issue authorized some time ago spent in extending the lines and improving facilities in their own neighborhoods. Street Railway Commissioner Witt says that if the funds are spent in this way nothing will be left with which to purchase new cars and increase the power equipment of the company.

Mr. Witt has received a communication from the Cleveland Railway Company containing a report of the superintendent of power on the condition of the power plants. The report shows that the plants have almost reached the limit of facilities for maintaining schedules. The letter made no suggestions, but pointed out that additional power can be had by erecting a new power plant or purchasing power from other sources. The city must indicate its choice between the two.

The new schedule on Superior Avenue which would eliminate every other stop may not be put into effect at once. Council failed to pass the ordinance which provides for this service and the matter has been referred back to the committee. Mr. Witt said that a gain of about 200 car miles a day would be made by the change. The advantage will come in the middle of the day, as the number of cars or the headway cannot be increased much during the rush hours.

A rule has been adopted by the Council to the effect that resolutions which provided for extensions and other important street railway legislation must be held in the committee ninety days.

Special Chicago Purchase Ordinance Passed

The Chicago (Ill.) City Railway has received the right to purchase that portion of the Chicago & Southern Traction Company which lies within the corporate limits of Chicago. The ordinance, which was passed by the City Council on Jan. 29, 1912, contains clauses which prescribe the following conditions: Residents as far south as 111th Street are brought within the 5-cent fare zone. The Chicago & Southern Traction Company has received the right to operate its cars over the surface lines. The interurban company has received the right to carry package express over the surface lines to a passenger and express station located on Harrison Street between State Street and Wabash Avenue. The Chicago City Railway has received the right to acquire the interurban line within the city limits. The interurban company can maintain its express station in Harrison Street only one year. After that date it will be moved south of Twelfth Street unless the City Council grants an extension of time. Additional express stations to be situated on private grounds also can be established not less than a mile apart. Cars devoted exclusively to express will run within the limits of the city of Chicago only between 11 p.m. and 5 a.m.

The Vote on the Detroit Ordinance

The defeat of the proposed new franchise in Detroit, Mich., on Jan. 23, 1912, which was referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 27, 1912, page 172, was decisive, but the total vote was very small. About 53,000 votes were cast, whereas it was expected that at least 70,000 or 75,000 voters would express their preferences. It is estimated that 5000 women voted. Under the law 60 per cent of the votes which were cast were needed to carry the franchise, whereas the measure received slightly more than 40 per cent.

It is thought that the decision of the Supreme Court of Michigan nullifying the municipal ownership amendment, which was rendered a few days previous to the election, had much to do with the defeat of the ordinance, notwithstanding the fact that the ordinance contained a clause providing for the sale of the property to the city whenever authority was given the city to make the purchase. Under the ruling of the Supreme Court, some time must necessarily elapse before the city charter can be revised and amended so that the city may operate or own street railways.

In commenting on the result of the election one newspaper said:

"The defeat of the ordinance means a halt in the growth of Detroit. Unless the new tracks which were provided for in the ordinance are built manufacturers cannot get sites for buildings nor get men to their plants to work, nor can any more residence sections be settled. Some time ago Mayor Thompson secured from the management of the company an agreement by which the company granted 3-cent fares from 5 a. m. to 8 p. m. and universal transfers and consented to build at least 10 miles of extensions every year, and also secured an option on the entire plant upon six months' notice, such notice to be given in the shape of an adoption of a municipal ownership ordinance by popular vote.

"This ordinance was so manifestly advantageous to the city that when it was first published it was received with universal acclaim. But in a week or two the politicians began to throw bricks at it. It was plain to all these people that with the street railway question actually settled their best source of political capital would be eliminated and they defeated it."

Report of Toledo Railways & Light Company for 1911

The report of the Toledo Railways & Light Company, Toledo, Ohio, for 1911, which was made public several days after the annual meeting of the company, follows:

Gross earnings	$3,139,721
Operating expenses	1,982,928
Net earnings	$1,156,793
Miscellaneous income	8,919
Income	$1,165,712
Taxes, interest, improvements and other expenditures	971,602
Surplus	$194,110

At the conference between Attorney Rathbun Fuller and City Solicitor Cornell Schreiber on Jan. 26, 1912, it was agreed that the company shall pay for the pavement between the tracks and 12 in. beyond the outer rails, instead of 18 in., as had been contended by the city. This coincides with the requirements of the present city ordinance governing the matter. Both attorneys agreed that the people would not be satisfied with any arrangement that did not require the company to pay for paving. Mr. Schreiber specified that in case the company uses ties that extend more than 1 ft. beyond the rails it shall pave that distance. Mr. Fuller agreed to this, but suggested that the amount of paving that the city should do each year be specified, for if much paving should be done one year and very little another the expense placed upon the company would be likely to hinder the proper operation of a sliding scale of fare.

The question as to the extensions to be built each year was settled without much argument. The amount was fixed at 2½ miles, with arbitration if the city should ask for an increase for any one year. The statute relative to the separation of grades will be followed in the franchise. Steam railroads are required to pay 65 per cent of the expenses of grade separation and the street railway is required to pay not more than one-half of the city's share of the expense. The course followed in other cities in regard to bridges will be examined before this point is taken up again. Mr. Fuller stated that the money which the company is required to expend for the use of bridges will stand as a charge which will affect the fare, and for that reason it should be made as light as possible.

Association Meetings

Massachusetts Street Railway Association—Boston, Mass., Feb. 14, 1912.

New England Street Railway Club—Boston, Mass., Feb. 22, 1912.

Central Electric Railway Association—Indianapolis, Ind., March 28, 1912.

Southwestern Electrical & Gas Association—San Antonio, Tex., April 25, 26 and 27, 1912.

Illinois Electric Railways Association—March 15, 1912.

Missouri Electric, Gas, Street Railway & Waterworks Association—Joplin, Mo., April 11, 12 and 13, 1912.

Sales Agency Extension of McGraw-Hill Book Company

The McGraw-Hill Book Company announces the completion of arrangements for the sales agency of the technical books of the *Railway Age Gazette*, the *American Engineer* and the *Signal Engineer*. This makes the McGraw-Hill Book Company publishers and distributors of books for the three journals, but it does not affect the publication of the papers themselves in any way. With the addition of these three papers in the railroad field, the McGraw-Hill Book Company now publishes books for the twelve leading American engineering papers in the fields of civil, mechanical and electrical engineering, electric and steam railroading, machine tools, mining, metallurgy, chemical engineering, etc. The papers now represented are the Electric Railway Journal, the *American Machinist, Engineering News, Electrical World, Railway Age Gazette, Power, Engineering Record, Engineering and Mining Journal, Coal Age, Metallurgical and Chemical Engineering, American Engineer* and *Signal Engineer*.

Date Set for Meeting of Southwestern Electrical & Gas Association.—The advisory and the executive committees of the Southwestern Electrical & Gas Association have decided to hold the eighth annual convention of the association in San Antonio, Tex., on April 25, 26 and 27, 1912.

Special Plant Records.—On Feb. 6, 1912, at 8:15 p. m., William D. Ennis, professor of mechanical engineering in the Polytechnic Institute, Brooklyn, N. Y., will talk on some special plant records in Room 8 of the Engineering Societies Building, New York. This is the second of the semi-monthly lectures which are being given under the auspices of the J. C. Jurgensen and Isherwood Branches of the Institute of Operating Engineers.

Electrification of Butte, Anaconda & Pacific Railway, Butte, Mont.—Harry Gallway, general manager of the Butte, Anaconda & Pacific Railway, a branch of the Chicago, Milwaukee & St. Paul Railway, has formally announced that it is proposed to equip the company's line between Anaconda and Butte with electricity at a cost of $1,000,000. As noted in the Electric Railway Journal of Jan. 20, 1912, the company has ordered fifteen 75-ton, 2400-volt electric locomotives from the General Electric Company.

B. J. Arnold in San Francisco.—Bion J. Arnold began his work of investigating the street railway problem of San Francisco, Cal., on Jan. 15, 1912, under the direction of the public utilities committee of the Board of Supervisors. He has advised the committee that it may take him a year to make a thorough study of the traffic problem and present complete plans for betterment. Mr. Arnold has stated that the pay-as-you-enter cars should have platforms large enough to accommodate twenty-five persons. He has advised that the pre-payment cars for use in San Francisco should be equipped with cross seats.

Subway Construction Progress in New York.—On Jan. 27, 1912, the Public Service Commission of the First District of New York received from its chief engineer a report upon the progress of work on the Lexington Avenue, the Fourth Avenue and the Brooklyn loop subways up to Jan. 15, 1912. By this report it appears that work is in progress on six sections of the Lexington Avenue subway and about ready to begin on another section; that nearly four-fifths of the contract value of the work has been done on the Fourth Avenue subway, and that on Section 9-0-1 of the Brooklyn loop line, the only section of that line remaining uncompleted, the excavation is 61 per cent completed, the concrete 14 per cent completed and erected steel work 12 per cent completed, or about 30 per cent of the value of the whole work. On Jan. 22, 1912, the commission opened bids for the construction of Section 2 of the Lexington Avenue line, and on Jan. 24 awarded the contract to the Degnon Contracting Company, New York, N. Y., for $2,335,828.50.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS.

The committee on street railways has sent in an advance report upon each of the following bills: House 334, relative to the heating of street cars; House 506, providing for the establishment of half-fare privileges for pupils of business schools traveling between such institutions and their homes; House 648, giving the Railroad Commission authority to investigate and supervise the ventilation of street cars, and House 647, providing for a report on the value of street railways within the State. The committee was scheduled to hold public hearings in Springfield on Feb.1 and 2 in connection with plans of the New England Investment & Security Company for the development of transportation in the territory of the Berkshire and Springfield Street Railway Companies. Among the recent bills introduced are House 1228, providing for the construction of a foot passage or tunnel between the Boylston Street station of the Tremont Street subway and the Washington Street tunnel; House 1292, requiring street railways, upon the request of the city or town authorities, to furnish adequate police protection for the safety of the public at terminal or other stations, the expense to be borne by the companies; House 1293, providing that the Railroad Commission shall require subway stations to be open all night in Boston, with accompanying car service; House 1028, requiring the Boston Elevated Railway to re-locate its Dover Street station at the junction of its Atlantic Avenue elevated line and the southerly approach tracks of the Washington Street tunnel; Senate 294, requiring the Boston Transit Commission to investigate the cost of removing the elevated railway structure at Forest Hills Square, Boston, and substituting one of so-called improved design, and House 1080, a bill of Representative Henebery, limiting the franchises granted street railways for the transportation of freight and express to maximum terms of twenty years. The bill includes a referendum provision and authorizes the Railroad Commission to grant these rights when in its opinion they are expedient in case the company fails to secure authorization from the local board of aldermen or selectmen. The policy of the commission has been to grant unlimited franchises, and the Henebery bill seeks to overthrow this, it being part of a continued effort to secure the limited franchise provision after several years of unsuccessful legislative campaigning.

NEW YORK

The following bills have been introduced into the New York Legislature: Amending the public service commissions law relating to the appointment of commissioners to the commission of the first district, prohibiting an employer during the continuance of a strike or lockout among his employees from advertising for employees or soliciting for them, personally or through agents, without including in the advertisement or stating with his solicitations the fact that a strike or lockout exists, and its true nature; amending the general corporation law (Section 6) by providing that a corporation becoming possessed of all the property and special privileges and franchises of any other corporation or corporations by merger may have the same name as one of the corporations to whose franchises it has succeeded; repealing so much of Chapter 216 of the Laws of 1846 as confers upon the Hudson River Railroad and its successor, the New York Central & Hudson River Railroad, any right to operate a railroad at grade south of Spuyten Duyvil, in New York City, and nullifying the city's consent to such operation at grade. The railroad is authorized by the bill to operate an electric road in a subway beneath the surface of any street, park or public place where it at present has a franchise for surface or elevated operation.

Financial and Corporate

Stock and Money Markets

Jan. 31, 1912.

Trading on the New York Stock Exchange to-day was confined largely to a few issues. More than one-third of the day's total of 900,000 shares was made up of dealings of the United States Steel stocks. Weakness was pronounced before the close. United States Steel declined 4 points, Union Pacific 3 points and many other declines exceeded more than a point. Quotations for loans to-day were: Call, 2½@2¼ per cent; sixty days, 2½@2¾ per cent; ninety days, 2¾@ 3 per cent.

In the Philadelphia market Philadelphia Electric was in demand around 18. Slight recessions were recorded in Rapid Transit and in Philadelphia Company.

In Chicago the chief interest centered in Chicago Railways 5's, which advanced to 100⅝. Commonwealth Edison was also fractionally higher.

In Boston the market was generally lower, reflecting the weakness in New York. The copper shares are receiving particular attention on the prospects for future output.

In Baltimore prices remained strong but gains, as a rule, did not exceed fractions.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 24.	Jan. 31.
American Brake Shoe & Foundry (common)	a95½	a95½
American Brake Shoe & Foundry (preferred)	a140	a139
American Cities Company (common)	*26½	26½
American Cities Company (preferred)	*78	78
American Light & Traction Company (common)	a300	a290
American Light & Traction Company (preferred)	a108	a107
American Railways Company	a45½	a45⅜
Aurora, Elgin & Chicago Railroad (common)	a40½	a42
Aurora, Elgin & Chicago Railroad (preferred)	a85½	a87
Boston Elevated Railway	a133¾	a134¼
Boston Suburban Electric Companies (common)	a13	a15
Boston Suburban Electric Companies (preferred)	*74	74
Boston & Worcester Electric Companies (common)	12½	a12½
Boston & Worcester Electric Companies (preferred)	54	a58
Brooklyn Rapid Transit Company	78⅜	77¾
Capital Traction Company, Washington	a124	a122½
[illegible]	[illegible]	a100
Chicago Elevated Railways (common)	a38	a36
Chicago Elevated Railways (preferred)	a93½	a93
Chicago Railways, ptcptg., ctf. 1	a104	a104
Chicago Railways, ptcptg., ctf. 2	a37½	a36¾
Chicago Railways, ptcptg., ctf. 3	a11	a10½
Chicago Railways, ptcptg., ctf. 4	a6	a6
Cincinnati Street Railway	129¾	131
Cleveland Railway	a105	a105
Cleveland, Southwestern & Columbus Ry. (common)	*4⅞	a4⅞
Cleveland, Southwestern & Columbus Ry. (preferred)	*33	*33
Columbus Railway & Light Company	a34½	34½
Columbus Railway (common)	83	83
Columbus Railway (preferred)	90	90
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Denver & Northwestern Railway	*145	*145
Detroit United Railway	85	a65
[illegible]	[illegible]	157
Georgia Railway & Electric Company (common)	a174	a176
Georgia Railway & Electric Company (preferred)	a87	a86
Interborough Metropolitan Company (common)	18⅛	17⅝
Interborough Metropolitan Company (preferred)	57¼	55¼
International Traction Company, 4% notes, rcts	*69½	*69½
Indiana Union Traction Company	*12	*12
Kansas City Railway & Light Company (common)	a22	a22
Kansas City Railway & Light Company (preferred)	a52	a52
Lake Shore Electric Railway (common)	*6⅞	*6⅞
Lake Shore Electric Railway (1st preferred)	*85	*85
Lake Shore Electric Railway (2d preferred)	*22	22
Manhattan Railway	135¾	135¾
Massachusetts Electric Companies (common)	a22⅛	a22¼
Massachusetts Electric Companies (preferred)	95⅝	a96
Metropolitan Street Railway, New York	*8	[illegible]
Milwaukee Electric Railway & Light (preferred)	*104¾	*104¾
Norfolk Railway & Light Company	*26	*26
North American Company	77⅝	77½
Northern Ohio Light & Traction Company (common)	a65	*65
Northern Ohio Light & Traction Company (preferred)	a105	a105
Philadelphia Company, Pittsburgh (common)	a51¼	a51¾
Philadelphia Company, Pittsburgh (preferred)	43¾	a44½
Philadelphia Rapid Transit Company	a23½	a23⅝
Portland Railway, Light & Power Company	*99⅝	*99⅝
Public Service Corporation	a109	a108
Seattle Electric Company (common)	a111	a112
Seattle Electric Company (preferred)	a102	a102½
Third Avenue Railway, New York	47¼	46½
Toledo Railway & Light Company	a4	3¾
Twin City Rapid Transit, Minneapolis (common)	a105¼	105
United Ry. & Electric Company (Baltimore)	18½	18½
United Rys. Inv. Co. (common)	33	34
United Rys. Inv. Co. (preferred)	59½	60⅛
Virginia Railway & Power Company (common)	a48	a47¾
Virginia Railway & Power Company (preferred)	a87	a87⅜
Washington Ry. & Electric Company (common)	a60	a60
Washington Ry. & Electric Company (preferred)	a92½	a91½
West End Street Railway, Boston (common)	a87½	a87¾
West End Street Railway, Boston (preferred)	a101½	a102½
Westinghouse Elec. & Mfg. Co.	74	a70
Westinghouse Elec. & Mfg. Co. (1st pref.)	a120	a120

*Last sale. a Asked.

ANNUAL REPORT

Lehigh Valley Transit Company

The annual report of the Lehigh Valley Transit Company, Allentown, Pa., for the year ended Nov. 30, 1911, compares with the previous year as follows:

Year Ended Nov. 30.*	1911.	1910.	Increase.
Passenger receipts	$1,141,138	$1,042,969	$98,169
Operating expenses	592,458	562,344	30,114
Net earnings from operation	$ 548,680	$ 480,625	$68,055
Miscellaneous and sale of power	190,343	159,851	30,492
Gross income	$ 739,023	$ 640,476	$98,547
Deductions, bond interest, rentals, taxes, etc.	453,645	436,872	16,773
Net income	$ 285,378	$ 203,604	$81,774
Miscellaneous deductions	939	261	678
Surplus	$ 284,439	$ 203,343	$81,096
Other income	10,237	6,857	3,380
Surplus	*$ 294,676	$ 210,200	$84,476

*From this surplus there should be deducted a dividend of $49,782. Other adjustments and deductions, including depreciation, leaves the final surplus on the books as $74,895.

R. P. Stevens, president and general manager, says in part in his report to shareholders:

"Your company owns or controls 158 miles of railway. The rolling stock of your company consists of forty-one open cars, ninety-eight closed cars and thirty-three miscellaneous cars, making 172 cars in all.

"The power house equipment consists of one main power house located at Allentown and nine well-equipped substations operated in connection with the main power house to provide for a proper and economical distribution of power. The main power house has a maximum capacity of approximately 23,600 hp, 8000 hp of which was installed during the past year. It consists of modern steam turbines with the latest and most efficient auxiliary apparatus.

"The generating cost during the past year has been reduced 17 per cent, and although the total kilowatt output has increased 10 per cent, the total cost of production has decreased over the same period $11,100.

"To the best of our knowledge your plant is producing current as cheaply as it is produced anywhere in this country under similar conditions, and it is being maintained in a state of highest efficiency.

"Numerous improvements have been made in your property during the past year, the benefits from which should be apparent in the coming year.

"A cut-off at Perkasie of 12,900 ft. resulted in lessening the trackage 7980 ft. and saves about fifteen minutes in the running time. All the new track was laid on private right-of-way and the maximum grade was reduced from 9½ per cent to 5½ per cent.

"Neat and commodious combination passenger and freight stations are being built at Perkasie, Sellersville and Lansdale.

"Ten pay-as-you-enter convertible passenger cars and one combination freight car and snow plow have been added to the equipment of your company.

"One 6000-kw Westinghouse turbine generator, with boilers and necessary auxiliaries, has been added to your power equipment.

"Many small cut-offs have been made on different divisions, eliminating curves, reducing grades and placing the track on private right-of-way. The results from similar work on your Slatington division last year proved that such improvements will be of material benefit to operation and lead to an increase in net receipts.

"In October, 1911, all the stock and bonds of the Montgomery Traction Company, aggregating $250,000 bonds and $250,000 stock, were purchased for $243,222. This line connects with the Philadelphia division of your company at Lansdale. This will give the company an entrance into Norristown and, by physical connection with the Philadelphia & Western extension at that point, an entrance into Philadelphia at Sixty-ninth Street, which will make it possible to reduce the running time from Allentown to City Hall, Philadelphia, from four and one-half hours to two and one-half hours. This should result in a large increase in gross earnings.

"A large majority of the stock and bonds of the Quakertown Traction Company was purchased during the past year, and this purchase should prove of great advantage to your company.

"Your company purchased in the past year $50,000 bonds of the Stroudsburg, Water Gap & Portland Street Railway, enabling that company to extend its lines to Portland and to provide for your company a through electric railway line from Philadelphia to the Delaware Water Gap and Stroudsburg. This should be the means of realizing a greatly increased summer tourist traffic.

"In December, 1911, the Allentown & South Allentown Bridge Company, all the stock of which is owned by your company, secured a perpetual franchise from the city of Allentown for a combination electric railway and toll bridge to cross the ravine at South Eighth Street, Allentown. Work on this bridge has been begun and its completion will be a great benefit to your company.

"In addition to the Allentown Electric Light & Power Company, Bethlehem Electric Light Company, South Bethlehem Electric Light & Power Company, Emaus Electric Light & Power Company and the Slatington Electric Light & Power Company, which your company controls, either through stock ownership or long-term leases, light and power companies have been organized for Washington Township, Whitehall, North Whitehall, South Whitehall, Hanover and Salisbury Townships.

"Your company owns all the stock of these new companies and practically supplies current for the entire electric light and power business of the Lehigh Valley.

"The express and freight business has shown a marked increase in extent and in net receipts and is becoming a source of substantial net revenue.

"Central Park, the amusement park of your company, has continued popular and has been a means of creating a substantial increase in business. Extensive improvements now being made will make this property one of the best amusement parks in Pennsylvania. It is practically self-sustaining.

"Gross passenger receipts for the past fiscal year increased $98,168, or 9.4 per cent. Car-mileage increased 244,673, or 6.8 per cent. Operating expenses for the fiscal year 1910 were 54 per cent of the gross receipts, and for 1911, 52 per cent, a decrease of 2 per cent.

"Total operating expenses per car mile for 1910 were 15.65 cents, and for 1911 15.44 cents, a decrease of 0.21 cent.

"Net operating earnings increased $68,055, or 14 per cent. The surplus revenue from all sources before discount, dividend or depreciation deductions was $294,676, or an increase of 40 per cent.

"From this revenue surplus, bond discount of $9,362, a depreciation reserve of $106,148, a 1 per cent dividend of $49,782 on the preferred stock and improvement charges of $54,488 were deducted, leaving a final surplus of $74,895.

"The physical condition of your property has been greatly improved during the year.

"The business in the Lehigh Valley region, not being so susceptible as other localities to general business depressions, is generally good at the present time. By reason of numerous industries now being established and extensions of existing plants, and the probable completion of your high-speed line into Philadelphia via Norristown in the early summer, the prospects for the coming year are extremely encouraging."

Chicago & Oak Park Elevated Railroad, Chicago, Ill.—At the annual meeting of the Chicago & Oak Park Elevated Railroad Henry C. Hackney, Albert C. Terrill and C. E. Robinson resigned as directors, and Sidney Ossoski, W. W. Jones and Edward J. Doyle were elected to succeed them. Mr. Ossoski was formerly secretary of the finance committee of the Chicago Railways and Mr. Jones is a director of that company. Mr. Doyle is secretary to Samuel Insull, president of the Commonwealth Edison Company. These new interests represent the Chicago Elevated Railways, the voluntary elevated railway holding company.

Chicago, Bluffton & Cincinnati Railroad, Bluffton, Ind.—Judge S. E. Cook, of the Circuit Court, has announced that the upset price of $800,000 for the Chicago, Bluffton & Cincinnati Railroad will stand, and has refused to sell the road unless it shall remain a steam railway. This ruling, it is said, will probably preclude arrangements to merge the road with the Marion, Bluffton & Eastern Traction Company and the Bluffton, Geneva & Celina Traction Company and electrify the road.

Grand Rapids, Holland & Chicago Railway, Holland, Mich.—The reorganization of the Grand Rapids, Holland & Chicago Railway, the sale of a controlling interest in which was referred to in the Electric Railway Journal of Jan. 27, 1912, page 176, has been effected by the election of the following directors and officers: Benjamin S. Hanchett, William Beach, G. J. Diekema, Charles A. Floyd, Lester J. Rindge, Willard Kingsley and Paul H. King, directors; president and treasurer, Benjamin S. Hanchett; vice-president, William H. Beach; secretary, Charles A. Floyd, and assistant secretary and treasurer, Paul H. King. Messrs. Rindge and Kingsley were members of the board elected when the company was organized in 1900 and retired when Mr. Hanchett relinquished control in 1904. Mr. Beach has been a member of the board from the beginning.

Indiana Union Traction Company, Anderson, Ind.—The Traction Light & Power Company has been incorporated with a preliminary capital stock of $10,000, with C. H. Allen, W. H. Forse, Jr., J. A. Van Osdol, A. W. Brady and H. A. Nicholl, who are all officers of the Indiana Union Traction Company, as directors, to take over the business now being done by the Indiana Union Traction Company in furnishing current for light and power.

Kansas City, Clay County & St. Joseph Railway, Jefferson City, Mo.—The Kansas City, Clay County & St. Joseph Railway has increased its capital stock from $720,000 to $1,000,000.

Lakeview Traction Company, Memphis, Tenn.—The Lakeview Traction Company was placed in the hands of J. H. Sullivan, president of the company, as receiver on Jan. 24, following a hearing by Chancellor Fentress in Memphis the previous day. Minority stockholders and creditors of the company joined in presenting the petition.

New York Railways, New York, N. Y.—Judge Lacombe, of the United States Circuit Court, has disallowed the claims of the Central Crosstown Railroad against the Metropolitan Street Railway and the New York City Railway. The claim against the Metropolitan Street Railway was for damages for breach of its lease, which occurred six months after the receivers of the Metropolitan Street Railway were appointed. The claim of the Central Crosstown Railroad against the New York City Railway was disallowed because the court held that there was no contract between the two companies.

Northern Electric Railway, San Francisco, Cal.—The Marysville & Colusa Branch Railway, the Sacramento & Eastern Railway, the West Side Railroad and the Sacramento-Folsom Electric Railway have been incorporated in California in the interest of the Northern Electric Railway and have filed mortgages to the Mercantile Trust Company, San Francisco, Cal., as trustee to secure thirty-year 5 per cent bonds, preparatory to extending the Northern Electric Railway. The Marysville & Colusa Branch Railway has a capital stock of $1,500,000 and bonds of $1,500,000. Each of the other companies has a capital stock of $1,000,000 and $1,000,000 of bonds.

Pekin & Petersburg Interurban Railway, Pekin, Ill.—The Gould Storage Battery Company, New York, N. Y., has applied for a receiver for the Pekin & Petersburg Interurban Railway. The affairs of this company were referred to under the heading "Mississippi Valley Interurban Railway" in the Electric Railway Journal of Dec. 30, 1911, page 1327.

Providence & Fall River Street Railway, Swansea Center, Mass.—The Providence & Fall River Street Railway has assigned in favor of the Industrial Trust Company, Providence, R. I., trustee of the mortgage securing the $165,000 of 5 per cent gold bonds of the company which are outstanding.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—Harry S. New has been elected a di-

rector of the Terre Haute, Indianapolis & Eastern Traction Company to succeed the late Hugh J. McGowan.

Toledo & Indiana Railroad, Toledo, Ohio.—The annual meeting of the stockholders of the Toledo & Indiana Railroad was held on Jan. 18, 1912. The directors and the officers were re-elected. The gross earnings for the past year were much in excess of those for the previous year. The carload freight business increased materially. The ballasting of the line has been completed and the power house at Stryker has been rebuilt. A new electric locomotive has been purchased and paid for. All this has been done out of the earnings.

Twin City Rapid Transit Company, Minneapolis, Minn.—Hayden, Stone & Company and William A. Read & Company have purchased jointly $1,000,000 of 5 per cent consolidated mortgage gold bonds of the Twin City Rapid Transit Company. These bonds cover the property of the Minneapolis Street Railway and the St. Paul City Railway and are taken from the amount held by the company in its renewal and reserve fund, which totals more than $1,000,000. William A. Read & Company are offering $500,000 of bonds at 105 and interest. Hayden, Stone & Company will dispose of their share without public offering. The Twin City Rapid Transit Company will spend $2,250,000 for new construction and improvements in 1912. This expenditure will be taken care of by disposing of $1,000.000 of consolidated bonds, and the remainder will be appropriated from surplus earnings.

Virginia Railway & Power Company, Richmond, Va.—Franchise amendments agreeing to the transfer of the Seven Pines line from the system of the Virginia Railway & Power Company to the Richmond, Urbanna & Peninsula Railway, as a nucleus for its proposed railroad to Urbanna, on the Rappahannock River, have been concurred in by the Richmond Common Council, and will be presented to the Mayor for his approval. As stated in the ELECTRIC RAILWAY JOURNAL of Dec. 16, 1911, page 1257, the contracts for the sale have been signed subject to the approval of the Council.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
ATLANTIC SHORE RAILWAY, KENNEBUNK, ME.							
1m.,	Dec.	'11	$22,841	$21,111	$1,729	.....	.....
1 "	"	'10	19,864	19,816	48	.....	.....
GALVESTON-HOUSTON ELECTRIC COMPANY.							
1m.,	Nov.,	'11	$132,004	$78.381	$53,623	$25,630	$27,992
1 "	"	'10	118,251	69,922	48,328	26,026	22,302
12 "	"	'11	1,501,188	879,627	621,561	301,189	27,992
12 "	"	'10	1,298,730	786,240	512,491	287,639	22,302
HOUGHTON COUNTY TRACTION COMPANY.							
1m.,	Nov.,	'11	$22.000	$13,009	$8,992	$7,756	$1,236
1 "	"	'10	22,799	13,028	9,771	6,638	3,134
12 "	"	'11	301,181	158,413	142,768	84,341	58,427
12 "	"	'10	312,526	165,641	146,885	78,642	68,642
HUDSON & MANHATTAN RAILROAD.							
1m.,	Nov.,	'11	$406,133	$173,858	$232,275	$209,415	$22,859
MONTREAL STREET RAILWAY.							
1m.,	Dec.	'11	$430,939	$268,339	$162,610	$42,061	$120,549
1 "	"	'10	377,274	235,209	142,065	37,642	104,423
3 "	"	'11	1,293,808	761,107	532,701	113,076	419,626
3 "	"	'10	1,130,060	668,401	461,659	101,653	360,006
NORTHERN TEXAS ELECTRIC COMPANY.							
1m.,	Nov.,	'11	$133,203	$69.315	$63,888	$25,714	$38,175
1 "	"	'10	119,263	63,308	55,954	23,879	32,076
12 "	"	'11	1,607,690	832,781	774,909	294,877	480,032
12 "	"	'10	1,423,321	760,083	663,238	235,701	427,538
TAMPA (FLA.) ELECTRIC COMPANY.							
1m.,	Nov.	'11	$60,318	$28.764	$31,555	$6,375	$25,180
1 "	"	'10	43,249	22,980	20,269	6,213	14,056
12 "	"	'11	672,187	352.473	319,715	77,851	241,863
12 "	"	'10	602,099	334,243	267,856	63,202	204,654
PENSACOLA (FLA.) ELECTRIC COMPANY.							
1m.,	Nov.	'11	$25,602	$14,584	$11,018	$5,669	$5,349
1 "	"	'10	24,427	14,327	10,099	5,067	5,032
12 "	"	'11	287,970	169,064	118,906	69,568	49,338
12 "	"	'10	267,952	157,453	110,499	60,010	50,489
PUGET SOUND ELECTRIC RAILROAD, TACOMA, WASH.							
1m.,	Nov.	'11	$132,856	$94,696	$38,161	$51,720	$13,560
1 "	"	'10	150,274	106,037	44.238	49,700	5,462
12 "	"	'11	1,766,936	1,203,938	372,998	605,886	32,889
12 "	"	'10	1,906,301	1,257,119	649,183	607,093	42,090
SAVANNAH (GA.) ELECTRIC COMPANY.							
1m.,	Nov.	'11	$63.332	$44,254	$19,077	$18.556	$511
1 "	"	'10	56.863	39,346	17,517	17,435	83
12 "	"	'11	688.103	466.980	221.123	220,202	921
12 "	"	'10	629,130	412,900	216.230	215,131	1,099

Traffic and Transportation

Operation of Express Service Proposed in Denver

The following ordinance has been introduced in the Board of Aldermen of Denver to allow the Denver City Tramway to adopt a system of "express" or "limited" cars for service during the rush hours for the accommodation of residents of outlying districts:

"Section 1. Any street railway company now running or operating, or which may hereafter run or operate, any street cars or any lines of street railway now constructed, or which may hereafter be constructed, within the limits of the city and county of Denver, may run and operate on all or any part of its said lines of street railway, and at such times as it may deem advisable or necessary, cars to be known and designated as 'express' or 'limited' cars.

"Section 2. The 'express' or 'limited' cars hereby authorized, and that may be run and operated hereunder, shall, within the district bounded by the following streets, viz.: Eighteenth Street, Broadway, West Colfax Avenue, Fourteenth Street and Wynkoop Street, stop upon signal for the receipt and discharge of passengers in the manner now provided by the ordinance of the city and county of Denver governing the running and operation of street cars, and outside said above-described district such 'express' or 'limited' cars shall stop upon signal at such place or places as may be selected and designated, as hereinafter provided by the company running and operating said cars.

"Section 3. All cars run and operated as 'express' or 'limited' cars shall in some appropriate manner, by sign or otherwise, conspicuously displayed on said cars, be designated as 'express' or 'limited,' and any company running or operating such cars on any of its lines or any part thereof shall outside the district described in Section 2 hereof, in some appropriate manner, by sign or otherwise, at the stopping place selected for such cars, designate the place or places where such cars stop upon signal for the receipt and discharge of passengers."

Additional Freight Franchises Sought.—The Worcester (Mass.) Consolidated Street Railway has asked the Selectmen of Grafton and Spencer for express and freight franchises.

Club Rooms in Springfield, Ill.—The Springfield (Ill.) Consolidated Railway will arrange club room quarters near Fifth Street and Monroe Street, a transfer point, to be used by employees.

Increase in Wages in Harrisburg, Pa.—The directors of the Central Pennsylvania Traction Company have decided to increase the wages of all conductors and motormen in the employ of the company 1 cent per hour, effective on Feb. 1, 1912.

Hearing on Height of Car Steps in Washington.—The District Electric Railway Commission has decided to hold a hearing on Feb. 7, 1912, to inquire into the question of the height which should be prescribed for the steps of cars operated in the District of Columbia.

Stools for Motormen of Connecticut Line.—The motormen of the Groton & Stonington Street Railroad, Mystic, Conn., are to be furnished with seats to be used within prescribed limits. This line is 20 miles long and the plan to equip the cars with stools has been approved by the Public Service Commission of Connecticut.

Trailer Operation on the Chicago, South Bend & Northern Indiana Railway.—The Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., is equipping six of its interurban cars with standard automatic couplers of the radial type in anticipation of operating a trailer service to handle passenger traffic during the rush periods.

Punishing Offending Drivers in Louisville.—The City Court in Louisville, Ky., has ruled that to delay a public conveyance constitutes disorderly conduct and that offenders may be punished under this charge, and the police of Louisville have been instructed to arrest the drivers of vehicles who interfere with street railway traffic by refusing to turn out of car tracks promptly when a car approaches.

Decision in Pittsburgh Street-Cleaning Case.—The Supreme Court of Pennsylvania has affirmed the decision of the lower court in the suit brought by the city to recover the company's share of the cost of cleaning streets on which its tracks are laid for five years ending in 1908. The suit was for $700,000. Judge Swearinger in the lower court cut the claim to $226,000, for which the jury brought in a verdict.

Bill for Universal Transfers in District of Columbia Passed.—The Senate has passed the bill introduced by Senator Gallinger "to require all street railway companies in the District of Columbia to issue free transfers, interchangeable from the lines of one company to those of another," and the passage of the measure by the Senate has been reported to the House and the bill referred to the House District committee.

Fare Zones Fixed Between Paterson and Hoboken, N. J.—The Board of Public Utility Commissioners of New Jersey has issued an order regulating the rate of fare which the Public Service Railway may charge upon its lines between Paterson and Hoboken. The order fixes four fare zones between the two cities, and directs that the company shall not charge more than 5 cents for each adult fare in each zone. The order takes effect on Feb. 6, 1912.

Arrest Under New Pennsylvania Transfer Law.—The first arrest under the new Pennsylvania law making it a misdemeanor for the holder of a transfer issued by an electric railway to give it to another person was made in Easton recently at the instance of the Easton (Pa.) Transit Company. The man who was arrested stated that he was ignorant of any violation of law. He was released upon payment of a fine. The law under which the man was arrested and fined was approved by Governor Tener on June 13, 1911.

Winter Operation of Part of New York State Line Abandoned.—The Public Service Commission of the Second District of New York has authorized the St. Lawrence International Electric Railroad & Land Company to discontinue the operation of its cars beyond the top of Church Hill in Alexandria Bay from Jan. 1 to March 15, 1912. The portion which is to be discontinued is dangerous and difficult to operate during the winter season, and traffic does not warrant its operation during the months in question.

Owl Service in Louisville.—The Louisville (Ky.) Railway has revised its schedule and changed the route of the cars used in its cross-town "owl" service. The recent changes lengthen the "owl" lines through the center of Louisville and to the suburbs from 7½ miles to more than 9 miles. The four cars used in the service leave either terminal at 7 minutes and 37 minutes after the hour respectively. After the 1 a.m. "owls" have completed their trips cars seating only thirty persons are substituted for the large cars.

Metropolitan Street Railway Association Ball.—The Metropolitan Street Railway Association, the membership of which consists entirely of employees of the New York (N. Y.) Railways, formerly the Metropolitan Street Railway, will hold its annual ball on the evening of Feb. 7, 1912, at Harlem Casino. The objects of the association are to furnish aid for sick and disabled members and in case of the death of a member to pay an indemnity to his relatives. The proceeds of the ball are used to establish a reserve fund for the association.

Cleveland Union Station.—The Ontario Land Company, Cleveland, Ohio, has sold to the Tillotson & Wolcott Company $160,000 of bonds which are secured by a mortgage on the land on which it is proposed to erect terminals and a union station in Cleveland for steam and electric railways which enter Cleveland. The land has been leased to the Terminal Building Company, of which W. H. Gratwick, Buffalo, N. Y., is president. Mr. Gratwick is also affiliated with the Cleveland & Youngstown Railroad, which plans to build into Cleveland and provide rapid transit service for the interurban electric railways which enter the city.

Co-operation of Public Asked to Keep Cars Warm in Brooklyn.—The Brooklyn (N. Y.) Rapid Transit Company has posted placards in all the cars on its surface lines requesting its patrons to co-operate with the company in keeping the cars warm during the winter months. The wording of the placard is as follows: "Notice to the Public.—During cold and inclement weather drafts through the car may be avoided, and the car thus left warmer and more comfortable, if passengers will leave by the rear door whenever possible. The co-operation of passengers is requested."

Man with Many Accidents.—Fred W. Long, claim adjuster of the Springfield (Ill.) Consolidated Railway, has discovered that a man going under the name of Jake Schneider, who claimed to have been injured from a fall on one of the cars of that company on Jan. 18, 1912, had received similar injuries in St. Louis on Nov. 27 and in Belleville, Ill., on Dec. 26. In St. Louis he had received $5 and in Belleville he had a case pending against the railway company. In each city he traveled under a different name. Testimony shows that he was an epileptic and suffered no injury from his fall in Springfield.

Meeting of Traffic Committee of Illinois Electric Railways Association.—The traffic committee of the Illinois Electric Railways Association will meet on Feb. 10, 1912, at the Hotel Leland in Springfield, Ill., to discuss further the desirability of adopting uniform interchangeable coupon tickets among the interurban electric railways in Illinois. Representatives from the traffic department of each of the member companies are urged to be present, as the form of contract governing the use of interchangeable coupon tickets will be drafted for final presentation at the next meeting of the association on March 15, 1912.

Freight Service Between Indianapolis and South Bend.—The Winona Interurban Railway, Warsaw, Ind., recently established a through freight service between Indianapolis and South Bend. This service has been widely advertised, as the shipments made over the electric railway are delivered twelve hours earlier than when made by steam railroads. Freight loaded in cars at Indianapolis in the afternoon is delivered at all points along the line by 6 a. m. the next day. The company used newspaper advertising and a postal card service to announce the new service. The postal cards will be sent out to non-shippers every two weeks.

Inspection of Railway Waiting Rooms in Indiana.—The Indiana Railroad Commission has ordered its inspectors to give particular attention to waiting rooms in railroad stations and to the heating of passenger cars. William J. Wood, chairman of the commission, is reported to have said: "I am coming to the conclusion that our inspection force has been so busily engaged with matters which affect the danger of railroad operation that it has given insufficient attention to the comfort of passengers. This commission desires inspectors to make stations a special feature of investigation and to look into the matter of the comfort of passengers on cars. It is the custom of some roads to heat their cars to a temperature of 80 deg. or more. This should be regulated."

Service Order in Troy, N. Y.—The Public Service Commission of the Second District of New York has ordered the United Traction Company to furnish a fifteen-minute service during the rush hours on its Oakwood Avenue line in Troy, and at least a twenty-minute service at other times of the day. The company has been furnishing a uniform twenty-minute service. The fifteen-minute service is to consist of a through service from the Union Station to the end of the Oakwood Avenue line from 6.30 a.m. to 8.30 a.m., from 11.30 a.m. to 1.30 p.m., and from 5 p.m. to 7 p.m. The Common Council of Troy passed an ordinance prescribing a ten-minute service on this line. The matter was carried to the Court of Appeals, which held that the Common Council had no power to pass such an ordinance and referred the matter to the Public Service Commission. After its investigation of the matter, the commission finds that the service now ordered would reasonably serve the public.

Suspension of Traffic in Appleton.—A. K. Ellis, general superintendent of the Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., explains that the suspension of traffic by that company, which was referred to in the Electric Railway Journal of Jan. 20, 1912, page 127, was not caused by cold, but by high water and ice, the ice having blocked under railroad bridges and at a dam below the bridges, causing back water to such a height that the company's power plant was flooded. The suspension was

not caused by any condition which could be controlled by the company. The bridges at which the ice jammed are owned by the Chicago, Milwaukee & St. Paul Railway and the Chicago & Northwestern Railway and the dam is owned and controlled by other water power users. The water backed into the power plant to such an extent that all pits, including cable pits and transformer pits, were flooded. Operation of the plant was suspended from 11.15 p.m. on Jan. 9 to 4.30 p.m. on Jan. 10.

Hearing on Appeal from Interchange Order in Toronto.—Argument has been heard by the Court of Appeals in the appeal by the Toronto Railway from the decision of the Ontario Railway Board, ordering an interchange of traffic with the proposed civic lines. H. S. Osler, for the company, claimed that such a ruling could not be given as one of the railways did not exist and the conditions which would be created by the order might prove a menace when the details of the construction of the city lines were completed. He maintained that it would be impracticable for the Toronto Railway to have cars from other lines run over its tracks on account of the frequency of its schedule. H. L. Drayton, corporation counsel, held that the plans and specifications of the city's lines were known. Justice Magee asked if it would be agreeable if the edict were limited to the Gerard and St. Clair Avenue lines. Justice Meredith said the court could not do that, as it had no question of details before it, only the general principle, and if it applied to any lines it applied to all.

Terminal Changes in Los Angeles.—Paul Shoup, vice-president of the Pacific Electric Railway, Los Angeles, Cal., has announced that contemplated plans for changes in the station of the company, at Sixth Street and Main Street, Los Angeles, will be made at once in an effort to relieve street railway traffic on Main Street. The company had planned to utilize the basement of the building at Sixth and Main Streets as an additional waiting room for passengers, in connection with a double track along San Pedro Street from Aliso Street to Sixth Street and then into the rear of the Pacific Electric Building. It now proposes to turn the basement of the building into a waiting room and train shed. Under the new plans four tracks will be run into the basement of the building on the south side, connecting the main line tracks of the company from Seventh and Ninth Streets, partly over a private right-of-way, for the use of all the south division cars. A waiting room is to be built with a staircase opening from the present main waiting room, and all of the Long Beach, San Pedro, Huntington Beach, Whittier, Santa Ana, La Habra and other south-bound cars will use the basement for a terminal. This will leave the upstairs waiting rooms and tracks for the use of the Pasadena and South Pasadena, Sierra Madre and other north-bound cars.

Subway Traffic in New York in December.—The Public Service Commission of the First District of New York has issued the following statement in regard to traffic in the subway during December, 1911: "For the first time in the history of the subway for a full month at a time the traffic in December, 1911, averaged 1,000,000 passengers a day, counting Sundays and Christmas as half days. The ticket sales for the month aggregated 28,495,555. As the traffic on Sundays is about one-half of what it is on business days, it is fair to count Sundays and Christmas as half days. On this basis there were twenty-eight full days in December, and for these twenty-eight days the average traffic was more than 1,000,000 passengers per day. In spite of the heavy traffic the accommodations provided were better than ever before in December. This is shown by the ratio of passengers to the car miles operated. This is figured on the basis of the number of tickets sold for each 100 car miles operated. This ratio in December last was 4.96, against 5.39 in December, 1910; 5.82 in December, 1909; 5.46 in December, 1908, and 5.04 in December, 1907. In other words, with a traffic of more than 1,000,000 a day in December, 1911, there were more cars operated and more seats provided in proportion to the traffic than in December, 1907, when only 17,768,649 passengers were carried. The December traffic in the subway exceeded the combined traffic on all the elevated railway lines in Manhattan and the Bronx by more than 1,600,000, the figures for the elevated being 26,887,240."

Personal Mention

Mr. W. A. McCutcheson has been elected president and general manager of the Cleburne (Tex.) Street Railway to succeed Mr. S. T. Shaw, resigned.

Mr. C. E. Warwick was recently appointed superintendent of the lines in Ft. Wayne operated as a part of the Ft. Wayne & Northern Indiana Traction Company's system in Indiana.

Mr. C. E. A. Carr, formerly general manager of the Quebec Railway, Light & Power Company, Quebec, Can., has accepted the position of general manager of the New Orleans, Southern & Grand Isle Railway.

Mr. D. M. Terry has been appointed publicity agent for the Winona Interurban Railway Company, with headquarters at Warsaw, Ind. Mr. Terry was formerly employed in the advertising departments of several Indianapolis newspapers.

Mr. E. O. McGrath, traveling freight and passenger agent for the Cincinnati, Hamilton & Dayton Railroad, has been appointed to a similar position with the Ft. Wayne & Northern Indiana Traction Company, with headquarters at La Fayette, Ind.

Mr. Bert Hall has been engaged by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., as welfare secretary and as secretary of the mutual benefit association which the company proposed to its employees when the pension system was made public recently.

Mr. William Stewart, who has been purchasing agent and secretary to the general manager of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., for the last four years, has been elected secretary and treasurer of the Newport News & Old Point Railway & Electric Company, with headquarters at Hampton, Va.

Mr. J. E. Broyles has been appointed special agent for the Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind. He has had operating and traffic experience as a dispatcher and agent on the Indiana Union Traction. He will have charge of all the agents for the Ft. Wayne & Northern Indiana Traction Company.

Mr. George E. Tracy has been appointed master mechanic of the Frederick (Md.) Railroad, and will have charge of the new shops of the company. Mr. Tracy goes to Frederick from Washington, where he was connected with the engineering department of the Washington Railway & Electric Company. His previous experience includes service on the Cleveland, Southwestern & Columbus Railway and on the North Jersey Street Railway, now the Public Service Railway, Newark, N. J.

Mr. Oscar L. Hill, passenger traffic agent for the Illinois Traction System, with offices in Springfield, Ill., since April 1, 1910, has resigned to engage in the insurance business. Mr. Hill started in railroad work when he was sixteen years old, working in Jerseyville, Ill., as an operator. Six years ago he became Northwestern freight and passenger agent of the Chicago & Alton Railroad, with offices in Minneapolis. He held this position until April 1, 1910, when he became connected with the Illinois Traction system.

Mr. Lee Massengale resigned recently as vice-president, secretary, treasurer and general manager of the Iola (Kan.) Railroad to accept the position of general manager and constructing engineer of the Grand View Railroad, St. Louis, Mo., formerly known as the Mont Sano Railroad. Mr. Massengale has been connected with steam and electric railways since 1883. He was master mechanic of the East St. Louis & Suburban Railway and master mechanic of the United Railways, St. Louis, before becoming connected with the Iola Railroad.

Mr. J. Brodie Smith, whose resignation as vice-president and general manager of the Manchester Traction, Light & Power Company, Manchester, N. H., was announced in the ELECTRIC RAILWAY JOURNAL of Dec. 30, 1911, has been prevailed upon to remain with the company in these capacities and to continue as in the past as the representative of the company, in its relations to the public in the territory in which the Manchester Traction, Light & Power Company does business. It will be recalled that Mr. E. C. Foster was

recently elected president of the company to succeed Mr. W. A. Tucker, Boston.

Mr. J. N. Shannahan has resigned as railway manager of the operating department of J. G. White & Company, Inc., New York, N. Y., to become vice-president and general manager of the Newport News & Old Point Railway & Electric Company, Newport News, Va., which has been taken over by Allen & Peck, Inc., as noted in the Electric Railway Journal of Jan. 20, 1912, page 93. Mr. Shannahan will also represent Allen & Peck, Inc., in the Southern territory, with Old Point as a center. Before becoming connected with J. G. White & Company, Inc., Mr. Shannahan was vice-president and general manager of the Washington, Baltimore & Annapolis Electric Railway. A biography of Mr. Shannahan was published in the Electric Railway Journal for May 27, 1911.

Mr. Williston Fish, who has been assistant to Mr. John M. Roach, president of the Chicago (Ill.) Railways, has been elected vice-president and general manager of the company. He was born in Berlin Heights, Ohio, in 1858. He entered Oberlin College in 1876, and later entered the military academy at West Point, from which he was graduated in 1881, with honors. Mr. Fish served in the United States army for several years as a lieutenant. At Ft. Trumbull, Conn., Lieut. Fish resumed the study of law in the office of Gov. Thomas Waller. He resigned from the army in 1887 and entered the employ of the Crane Elevator Company, Chicago, as a salesman. He remained with that company for a year and a half and meanwhile continued studying law at night in the school of Judge Thomas Moran and was admitted to the bar in 1897. Mr. Fish became connected with the South Chicago City Railway in 1890 and remained with that corporation for nine years. He acquired most of the right-of-way for the company and drew up all the contracts. About this time Mr. Fish was made assistant to Mr. Jesse Spaulding, then president of the Chicago Union Traction Company, and Mr. Fish continued in this capacity for several years. When Mr. John M. Roach was made president of the Chicago (Ill.) Railways, Mr. Fish was made assistant to Mr. Roach. Before the organization of the Chicago Railways Mr. Fish served as a director of the Chicago Union Traction Company and of its subsidiary corporations. Mr. Fish has also been elected to the directorate of the Chicago Railways Company.

OBITUARY

S. S. Smith, manager in Texas of the General Fire Extinguisher Company, Providence, R. I., died suddenly at New Orleans on Jan. 20, 1912.

Matthew Neilson, who was general manager of the St. John (N. B.) Street Railway from 1897 to 1904, died at his home in Montreal on Jan. 21, 1912. Mr. Neilson was born in Almonte, Ont., fifty-nine years ago. He was connected with the Canadian Pacific Railway for many years and had lately been connected with the Mexican Light, Heat & Power Company.

J. W. Sturdevant, claim agent of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, died in Youngstown on Jan. 27, after a short illness. Mr. Sturdevant was born in Rome township, Ashtabula County, Ohio, on July 20, 1871. He entered business as a telegraph operator with the Nickel Plate and the Lake Shore Railways. Later he became connected with the car service department of the Lake Shore Railway and was subsequently appointed claim agent of that company. He remained with the Lake Shore Railway until 1902, when he accepted the position of claim agent of the Mahoning & Shenango Railway & Light Company.

Edwin Hawley died on Feb. 1, 1912, at his home in New York of nervous indigestion following an attack of grip. Mr. Hawley was born in Chatham, N. Y., in 1850 and began railway work when he was seventeen years old as a clerk on the Erie Railroad. In 1899 he became associated with Collis P. Huntington in the Southern Pacific Railroad. With his associates, Mr. Hawley controlled the Chesapeake & Ohio Railroad, the Iowa Central Railroad, the Minneapolis & St. Louis Railroad, the Missouri, Kansas & Texas Railroad, the Hocking Valley Railroad and several less important lines. He was a director of the Interborough Rapid Transit Company and the Interborough-Metropolitan Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Traction Light & Power Company, Anderson, Ind.**—Incorporated in Indiana to take over the business now being done by the Indiana Union Traction Company in furnishing current for light and power. Capital stock, $10,000. Incorporators: C. H. Allen, W. H. Forse, Jr., J. A. Van Osdol, A. W. Brady and H. A. Nicholl, who are all officers of the Indiana Union Traction Company.

Coraopolis & Woodlawn Interurban Railway, Coraopolis, Pa.—Chartered in Pennsylvania to build a 10-mile electric railway between Coraopolis and Woodland, via Stoops Ferry, Glen Willard, Wireton and Scottsville. Capital stock, $60,000. Among the incorporators are: E. C. Dithrich, Coraopolis, president; C. B. Ferguson, W. J. Dithrich, J. W. Arros and F. H. Stark, Coraopolis; J. E. Schell, H. McAfee and Charles Gibson, Jr., Pittsburgh, and E. E. Laughner, South Heights. [E. R. J., Dec. 16, '11.]

***Clarksburg & Philippi Traction Company, Clarksburg, W. Va.**—Chartered in West Virginia to build an electric railway from Clarksburg to Philippi and from Craigmoor to Buckhannon. Capital stock, authorized, $300,000. Incorporators: Thomas L. Nutter, Clarksburg; E. R. Dyer, J. C. Watson, R. J. Dunham, Philippi; Charles C. Robb and J. P. Necessary, Fairmont, W. Va.

***Mannington, Wadestown & Blacksville Railway, Mannington, W. Va.**—Incorporated in West Virginia to build an electric railway from Mannington to Blacksville, via Wadestown. Headquarters Mannington. Capital stock, $50,000. Incorporators: S. B. Harker, S. Clark Steele, Wana; Samuel Eakin and M. J. Garrison, Wadestown, and E. C. Martin, Mannington.

FRANCHISES

Calistoga, Cal.—The San Francisco, Napa & Calistoga Railway, San Francisco, has received a franchise from the Board of Trustees in Calistoga.

Fresno, Cal.—Albert Albright, representing the Fresno, Coalinga & Monterey Company, Fresno, has asked the Chamber of Commerce to furnish a survey and private right of way for a branch from Hollister through the Santa Clara Valley. The line will connect Fresno, Coalinga, Hollister, Salinas and Monterey. T. C. White, Fresno, president. [E. R. J., Sept. 23, '11.]

Glendale, Cal.—E. D. Goode, Glendale, has asked the City Council for a franchise on Grand Boulevard, to Pacific Avenue, thence south to Vine Street and west along Vine Street to the city limits of Glendale. [E. R. J., Dec. 16, '11.]

Pasadena, Cal.—The Pacific Electric Railway, Los Angeles, has asked the City Council for a franchise to electrify the Southern Pacific Railway lines in Pasadena from Colorado Street depot to a point near the Hotel Raymond in Pasadena.

Sacramento, Cal.—The Vallejo & Northern Railway, Vallejo, has asked the Council for a franchise over several streets in Sacramento.

San José, Cal.—The Peninsular Railway has received a franchise from the Common Council for its Alum Rock Park road extension into Alum Rock Park, several miles east of San José.

Stockton, Cal.—The Central California Traction Company, San Francisco, will ask the City Council for a franchise along Tuleberg Levee, in Stockton, to the Crown Mills.

Glastonbury, Conn.—The Connecticut Company has asked the Selectmen for a franchise for several crossings in Glastonbury.

Covington, La.—W. J. Tracy, Cleveland, Ohio, has received franchises for an interurban railway along the northern shores of Lake Pontchartrain to connect with New Orleans on the east side, and from Covington or Madisonville westward toward Baton Rouge. [E. R. J., Dec. 23, '11.]

Presque Isle, Maine.—The Aroostock Valley Railroad has received the approval of the Maine Railroad Commissioners for 2 more miles of track to New Sweden, making 19 1-3 miles which have been approved.

Johnstown, N. Y.—The Little Falls & Johnstown Electric Railway, Little Falls, has applied to the Public Service Commission, Second District, for authority to exercise its franchise and for a certificate of convenience and necessity to build its line to connect Little Falls, St. Johnsville, Ephratah and Johnstown. J. L. Hees, 103 Park Avenue, New York, N. Y., president. [E. R. J., Dec. 30, '11.]

Etobicoke, Ont.—The Toronto & York Radial Railway, Toronto, has asked the City Council for a franchise in Etobicoke.

Port Arthur, Ont.—The Port Arthur Traction Company will ask the Council for permission to extend its line to districts outside the city boundaries.

Portland, Ore.—The Portland Railway, Light & Power Company has received a franchise from the City Council to double-track Sandy Boulevard to East Sixty-first Street in Portland.

New Castle, Pa.—The Beaver, Koppel & New Castle Railway, New Castle, has asked the City Council for a franchise in New Castle. The line will connect New Castle, Hillsville, Poland and Youngstown. C. E. Glenn, New Castle, president. [E. R. J., Jan. 13, '12.]

Chattanooga, Tenn.—The Chattanooga Traction Company has received a franchise from the Board of City Commissioners to build its line to Dayton and Cleveland, Tenn., and to Dalton, Ga., out of Chattanooga. Work will be begun at once. C. E. James is interested. [E. R. J., Nov. 11, '11.]

Ogden, Utah.—The Ogden Rapid Transit Company has asked the County Board of Commissioners for a franchise to use certain highways and county roads in Weber County.

***Bothell, Wash.**—C. Beardslie, A. Larson and A. K. Rouse, representing Chicago capitalists, have asked the City Council for a franchise in Bothell. This is part of a plan to build an electric railway between Seattle and Bothell.

Vancouver, Wash.—The Washington-Oregon Corporation, Vancouver, has asked the Council for a right-of-way across the Vancouver military reservation.

Huntington, W. Va.—The Ohio Valley Electric Railway has been granted permission by the County Court to double-track its line at Camden Park as far as the edge of Cabell County. Work has been begun at Camden Park. The company has asked the City Commissioners for a franchise to double-track the line in Huntington from Twenty-fourth Street to the city limits.

Madison, Wis.—The Chicago & Wisconsin Valley Railroad, Madison, has received a certificate of convenience and necessity from the Railroad Commission to build its electric railway from Janesville to Merrill, via Madison, Portage, Grand Rapids and Wausau. Allen T. Russell, Chicago, general manager. [E. R. J., Jan. 20, '12.]

TRACK AND ROADWAY

Texarkana Gas & Electric Company, Texarkana, Ark.—This company has awarded the contract to the Texas Building Company to extend the Rose Hill line to Westmoreland Place.

Burlingame, Cal.—It is reported that financial backing has been secured and construction will be begun in the spring on the proposed electric railway from the Easton Station in Burlingame to the foothills, and later, in the opposite direction to Coyote Point. Ansel M. Easton and J. F. Rodgers are interested. [E. R. J., Aug. 5, '11.]

Pacific Electric Railway, Los Angeles, Cal.—Work will be begun by this company within the next few weeks on the extension of its East Washington line to the new Nazarene University.

Pacific Electric Railway, Los Angeles, Cal.—A 5-mile double-track extension will be built by this company from Santa Ana to Orange.

East Shore & Suburban Railway, Richmond, Cal.—Work has been begun by this company double-tracking its line between Oakland and Pullman, a distance of about 3 miles.

San Diego (Cal.) Electric Railway.—Work has been begun by this company on the construction of 10 miles of second track in San Diego.

Northern Electric Railway, San Francisco, Cal.—Free right of way has been offered to this company if it will build its line through Sutter City.

United Railroads, San Francisco, Cal.—This company plans to build 3 miles of track during 1912.

Boulder Electric Light & Power Company, Boulder, Col.—About 1 mile of new track will be built by this company during 1912.

Shore Line Electric Railway, Saybrook, Conn.—A 5-mile extension between Deep River and Chester will be built by this company during the year.

Bridgeport & Danbury Electric Railway, Bridgeport, Conn.—This company has completed about 8½ miles of its line. This section extends from a point about a mile north of the terminal in Bridgeport to Long Hill. The right-of-way has been graded and the poles set and construction will be begun in the spring on the section to Upper Stepney, about 12½ miles above Bridgeport, and approximately half way between Bridgeport and Danbury. [E. R. J., Nov. 18, '11.]

Washington Railway & Electric Company, Washington, D. C.—This company plans to extend its line through Cleveland Park and thence out Massachusetts Avenue to the District line in Washington, D. C.

Tampa (Fla.) Electric Company.—This company plans to build 1½ miles of new track.

Georgia Railway & Power Company, Atlanta, Ga.—Surveys have been begun by this company on its 10-mile line between Decatur and Stone Mountain.

***Red Bud & Belleville Interurban Railway, Red Bud, Ill.**—This company has been dissolved.

Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.—Plans are being prepared by this company for the construction of an extension from Geneva, Ind., to Celina, Ohio, via London and Dearborn.

Gary & Southern Traction Company, Crown Point, Ind.—This company has placed in operation its line between Gary and Louttaville, a distance of 8 miles. Work will soon be begun on the Crown Point extension.

Evansville, Christney & Eastern Railway, Evansville, Ind.—Surveys will be begun by this company as soon as the weather permits on its line between Boonville, Christney, Lynnville and Evansville. Franchises will soon be asked in Boonville, Christney and Lynnville. J. P. Christney is interested. [E. R. J., Nov. 18, '11.]

Indiana & Ohio Southern Interurban Railroad, Rising Sun, Ind.—This company will award contracts at an early date for the construction of its 9½-mile electric railway between Aurora and Rising Sun. It will ultimately connect Cincinnati and Louisville. The company's repair shops will be located at Rising Sun. The company will use gasoline motor cars until the line justifies electrification. Capital stock, authorized, $130,000. Capital stock, issued, $10,000. Officers: Lucian Harris, Rising Sun, president; J. W. Whitlock, Rising Sun, vice-president; James N. Perkins, Rising Sun, secretary; Raymond D. Lynch, Chicago, treasurer, and Raymond S. Zeitler, Chicago, general manager, purchasing agent and chief engineer. [E. R. J., Nov. 18, '11.]

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—About 15 miles of new track will be built from Cedar Rapids as a center by this company during 1912.

Kentucky Southwestern Railway, Light & Power Company, Hickman, Ky.—The management of this company, which has projected a line from Hopkinsville to Paducah and Hickman, is now in the hands of H. C. Rhodes and John D. Smith. Formerly it was in the hands of the vice-president and general manager, E. F. Wheaton. [E. R. J., Dec. 9, '11.]

Mexico (Mex.) Tramways.—Work will be begun during the year by this company on its extension to connect the capital with Puebla and Toluca.

Interurban Construction Company, Hastings, Minn.—This company has placed an order for 2035 tons of 70-lb. rails with the Illinois Steel Company for the first section of its line from St. Paul to Hastings, a distance of 18 miles.

Butte, Anaconda & Pacific Railway, Butte, Mont.—This company plans to electrify about 27 miles of its line. The

power will be generated at the plant of the Great Falls Water Power Townsite Company.

*Buffalo, N. Y.—The City Council has passed a resolution asking the Public Service Commission, of the Second District, to require the International Railway to establish a crosstown line between the Elmwood and Hoyt lines and the Clinton and Williams Street lines, through either Eagle or North Division Street, in Buffalo.

Hudson & Manhattan Railroad, New York, N. Y.—During the year this company plans to build a 2-mile extension between Thirty-third Street and Forty-second Street and Lexington Avenue, New York.

Halifax Electric Tramway Company, Ltd., Halifax, N. S.—During 1912 this company expects to construct 3 miles of new track in Halifax.

*Cleveland, Ohio.—D. J. Zinner plans to build a 2-mile electric railway in Cleveland. The line will cross the flats over Clark Avenue and connect with the East Fifty-fifth Street line at Broadway and East Fifty-fifth Street.

Lake Erie & Northern Electric Railway, Brantford, Ont.—This company's right-of-way is completed between Brantford and Port Dover. The City Council has granted rights for a new entrance to Brantford with a terminus at the old Great Western Railway depot. The line will connect Port Dover, Brantford, Simcoe, Waterford and Paris. W. P. Kellett, Brantford, general manager. [E. R. J., June 24, '11.]

Hamilton (Ont.) Street Railway.—This company plans to build a new loop to relieve congestion on its Barton Street line in Hamilton.

*Stratford, Ont.—J. C. Rothery, Toronto, is negotiating with the civic officials, it is reported, relative to acquiring the charter of the Stratford Railway, and connecting the electric line with the Canadian Northern line which is to be constructed through Western Ontario.

Toronto (Ont.) Suburban Railway.—This company is asking the Legislature of the Province of Ontario for an act authorizing it to extend its line from Guelph to Berlin, Preston, Hespeler and Galt, and thence to Hamilton, passing through Guelph, Waterloo, Dumfries, Preslinch, Beverly, Flamboro west and Ancaster.

*Toronto, Ont.—The Board of Control has called for bids for the supply of track intersections and other special work layouts for the construction of its municipal lines. G. R. Geary is chairman of the Board of Control.

Terminal Railway, Marshfield, Ore.—This company advises that it will award contracts about March 1 for the construction of its 5-mile electric railway between Empire, North Bend and Marshfield. It is expected to begin work about March 15. The company's power house and repair shops will be located at Marshfield. Capital stock, authorized, $200,000. Officers: Arno Mereen, president; L. I. Simpson, vice-president; James H. Flanagan, secretary; J. W. Bennett, treasurer, and W. S. Chandler, general manager, all of Marshfield. [E. R. J., Dec. 23, '11.]

Mount Hood Railway & Power Company, Portland, Ore.—Extension of its lines is being planned by this company on the east side of Portland.

Pennsylvania & Maryland Street Railway, Elk Lick, Pa.—This company plans to build an extension from Garrett to Johnstown.

Southern Cambria Railway, Johnstown, Pa.—This company has placed in operation its line from Ebensburg to Johnstown.

Wilkes-Barre (Pa.) Railway.—This company has decided to extend its line from the forks of the road at the lower end of Pittston into Sebastopol. The company has already laid tracks from South Main Street to the city line.

Montreal (Que.) Street Railway.—Work has been begun by this company on its Sherbrooke Street line east in Montreal.

Montreal & Southern Counties Railway, Montreal, Que.—The construction of 200 miles of track and the electrification of the old Granby & Waterloo Railway, a steam line 45 miles long, have been decided upon by the Board of Directors of this company.

Olivet (S. D.) Interurban Railroad.—This company advises that its proposed 137-mile line between Centerville, Tuscan, Olivet, Milltown, Mitchell and Pierre will probably be operated by steam. M. R. Jenison, Olivet, secretary. [E. R. J., Jan. 20, '12.]

Sioux Falls & Southern Minnesota Traction Company, Pierre, S. D.—Preliminary surveys have been completed, right-of-way secured and construction will be begun as soon as the weather permits on this electric railway between Sioux City, S. D., and Albert Lea, Minn., via Worthington, Sheppard, Spring Valley, Dresden, Loon Lake, Petersburg, Pilot Grove and Silver Lake. G. P. Peterson, Pierre, S. D. [E. R. J., Nov. 18, '11.]

Knoxville Railway & Light Company, Knoxville, Tenn.—This company will construct 1.6 miles of new track in Knoxville during 1912.

Austin (Tex.) Electric Railway.—About 2 miles of new track will be built in Austin during the year by this company.

El Paso, Tex.—It is reported that Stone & Webster are considering plans to build an electric railway from El Paso through the El Paso valley to Socorro or some other point in the lower part of the valley. A survey has been made. Among those interested are W. E. Anderson, Robert L. Dorbandt and Winchester Cooley. [E. R. J., Nov. 25, '11.]

*Riviera, Tex.—Theodore F. Koch has let the contract to S. A. Robertson, San Benito, Tex., for the construction of an interurban railway from Riviera to Riviera Beach, a distance of about 10 miles. The proposed line will connect with the St. Louis, Brownsville & Mexico Railway at Riviera.

San Antonio (Tex.) Traction Company.—W. B. Tuttle, manager of this company and the San Antonio Gas & Electric Company, states that the two companies will spend $300,000 in new equipment and improvements during 1912.

*Wolfe City, Tex.—Plans are being made by the Mansfield Engineering Company to build a 193-mile electric railway in northeast Texas. The proposed route is from Dallas to Greenville and to Wolfe City, from Wolfe City, via Bonham to Denison, from Wolfe City, via Cooper to Paris, from Cooper Junction, via Deport to Clarksville.

Utah Light & Railway Company, Salt Lake City, Utah.—This company plans to extend its East Second South Street line in Salt Lake City from the present terminus at Ninth South and Thirteenth East Streets to connect with the Sugar House line.

Brattleboro (Vt.) Street Railway.—A ½-mile extension will be constructed in Brattleboro by this company during 1912.

Danville (Va.) Traction & Power Company.—During 1912 this company will construct about 1 mile of new track in Danville.

Whatcom County Railway & Light Company, Bellingham, Wash.—This company has under construction a line from Bellingham to Sedro-Woolley.

Wenatchee Valley Railway & Power Company, Wenatchee, Wash.—It is reported that this company has secured financial backing and will begin construction in the spring on its 50-mile electric railway between Wenatchee and Leavenworth. A. J. Linville, Wenatchee, president. [E. R. J., Dec. 30, '11.]

Kirkland-Redmond Railway, Light & Power Company, Seattle, Wash.—This company advises that surveys are almost completed and grading will be begun about Feb. 15 for its 12-mile electric railway between Kirkland and Redmond, and other points in Kings County. The company will also furnish power for lighting purposes. A steam power plant will be located at Redmond. Capital stock authorized $200,000. Capital stock issued $40,000. Officers: C. A. Eaton, 1627 Fourth Avenue, Seattle, president; William Perigo, Redmond, vice-president; Boone F. Gorden, Seattle, secretary; S. G. Hepler, Seattle, treasurer; A. D. Stevens, Seattle, chief engineer; Eaton & Hepler, Seattle, electrical engineers. Headquarters: 1627 Fourth Avenue, Seattle. [E. R. J., Jan. 6, '12.]

Seattle, Wash.—Bids were opened Jan. 10 by the Board of Public Works, Seattle, for the construction of division A of the municipal electric street railway, the work includ-

ing about 7½ miles of track, the bids received being as follows: Jahn Construction Company, Seattle, $148,927; Graff Construction Company, Seattle, $172,488; Stillwell Brothers, Seattle, $211,800. A. R. Dimmock is city engineer. [E. R. J., Dec. 30, '11.]

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—Work will soon be begun by this company on an extension from Fairmont to Weston.

SHOPS AND BUILDINGS

San Diego (Cal.) Electric Railway.—This company is building a reinforced-concrete, steel-lined oil storage tank, in San Diego, with a capacity of 400,000 barrels.

Vallejo & Northern Railway, Vallejo, Cal.—This company has awarded a contract for the construction of its new depot in Woodland to the H. G. Fields Company, San Francisco. [E. R. J., Jan. 27, '11.]

Shore Line Electric Railway, New Haven, Conn.—This company has awarded a contract to build a new station at its present terminal at New Haven to John G. Holbrook. The building will be a frame structure of the bungalow type and will be conducted as a waiting station and restaurant. Mr. Holbrook has also been awarded a contract to build sheds at the company's carhouse at Old Saybrook.

United Railways & Electric Company, Baltimore, Md.—Plans are being made by this company to begin work in the spring on the construction of its new carhouse on the Hartford Road, near Weber's Park, in Baltimore. The building will contain a number of offices and a recreation room and gymnasium for the employees of the company. In size, construction and general appearance the building will conform to the other carhouses built recently by the company.

Oregon Electric Railway, Portland, Ore.—Plans are being made by this company to build a new depot in Salem.

Virginia Railway & Power Company, Richmond, Va.—This company will build new carhouses and repair shops on the Norfolk baseball grounds in Norfolk, which will cost when completed about $200,000. The plans call for two large buildings to be used for the accommodation of all the cars on the Norfolk side of the river. After the completion of its carhouses, each of which will be 400 ft. x 160 ft., the company will abandon its present carhouses on Church Street and sell the property. The company will also build a twelve-story office building on Seventh Street and Franklin Street, in Richmond. Four floors will be reserved for the use of the company and the remainder will be rented. The structure will be 50 ft. x 130 ft. and will cost $250,000. The company has purchased the adjoining lot on Franklin Street.

POWER HOUSES AND SUBSTATIONS

Kentucky Traction & Terminal Company, Lexington, Ky.—This company has awarded a contract for the construction of a new substation 2 miles from Frankfort to the Capital Lumber & Manufacturing Company, Frankfort. The structure will be of brick and concrete construction. It will be equipped with two 300-kw units. Work will be begun at once.

Cincinnati (Ohio) Traction Company.—This company is installing a new 6000-kw turbo-generator in the Pendleton power plant in the East End.

Montreal & Southern Counties Railway, Montreal, Que.—Among the improvements planned by this company in the near future will be the construction of a new substation.

Aberdeen (S D.) Railway.—This company plans to build a new power plant in Aberdeen.

Nashville Railway & Light Company, Nashville, Tenn.—Negotiations are said to be pending on a contract for power between the Nashville Railway & Light Company and the Great Falls Power Company, which will soon be ready to operate its plant on the Caney Forks near Nashville. Inducements are also said to have been made to the railway company to secure its power from the Chattanooga Electric Light, Heat & Power Company, which has a new station at Hale's Bar, between Nashville and Chattanooga.

Wheeling (W. Va.) Traction Company.—This company plans to build an addition to its South Side power plant in Wheeling.

Manufactures and Supplies

ROLLING STOCK

Tidewater Power Company, Wilmington, N. C., expects to build three 21-ft. closed, single-truck city cars.

Rochester & Manitou Railway, Rochester, N. Y., has ordered six Brill 27-G-1 trucks from the G. C. Kuhlman Car Company.

Evansville & Southern Indiana Traction Company, Evansville, Ind., is reported to be in the market for six prepayment cars.

Oneida (N. Y.) Railway has ordered two special-type semi-convertible steel car bodies from the G. C. Kuhlman Car Company.

Ogden (Utah) Rapid Transit Company has ordered seven GE-80 form A 500-volt railway motors from the General Electric Company.

Slate Belt Electric Street Railway, Pen Argyl, Pa., has ordered one 30-ft. 1-in. convertible pay-within car body from The J. G. Brill Company.

Washington Railway & Electric Company, Washington, D. C., has ordered fifty fourteen-bench Narragansett open motor-car bodies from The J. G. Brill Company.

Seattle, Renton & Southern Railway, Seattle, Wash., has ordered six double equipments of No. 317 motors type HL control from the Westinghouse Electric & Manufacturing Company.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va., has ordered four 28-ft. semi-convertible car bodies mounted on Brill 27-MCB-1 trucks from the G. C. Kuhlman Car Company.

International Railway, Buffalo, N. Y., has specified that the 100 "near-side" car bodies ordered from the G. C. Kuhlman Car Company shall be 34 ft. 1⅜ in. long and be mounted on Brill 39-E trucks.

Atlantic Coast Electric Railway, Asbury Park, N. J., has ordered three 28-ft. closed motor-car bodies mounted on Brill 27-G-1 trucks and three fifteen-bench open motor-car bodies mounted on Brill 22 trucks from The J. G. Brill Company.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind., has received bids for a prepayment type of car with a 21-ft. body mounted on Curtis single trucks. The company also recently placed orders for thirty additional single trucks for city service. They are equipped with GE-216 motors.

Springfield (Ill.) Consolidated Railway, reported in the ELECTRIC RAILWAY JOURNAL of Jan. 13, 1912, as being in the market for several new cars, expects to place an order soon for twelve double-truck pay-as-you-enter-cars for single-end operation. They will have arched roofs and will be equipped with maximum traction trucks.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., noted in the ELECTRIC RAILWAY JOURNAL of Nov. 25, 1911, as being in the market for twenty-two cars, has ordered one freight car, four package and express cars, eight combination passenger, baggage and smoking cars and eight passenger and smoking cars from the Cincinnati Car Company.

TRADE NOTES

Chain Belt Company, Milwaukee, Wis., has opened an office in Chicago at 900 Old Colony Building, in charge of Benjamin S. Reynolds.

Ralston Steel Car Company, Columbus, Ohio, has appointed A. D. McAdam its Chicago representative with office at 720 People's Gas Building.

Automatic Fire Sprinkler Company of America, Akron, Ohio, it is said, has practically decided to remove its plant from Akron to Lansingville, near Youngstown.

Perry Ventilator Corporation, New Bedford, Mass., has received an order for ventilators for the new cars of the Wilmington & Philadelphia Traction Company, now being built by The J. G. Brill Company.

Watson-Stillman Company, New York, N. Y., has elected

the following new officers: Francis H. Stillman, president (re-elected); F. A. Stillman, vice-president; J. P. Bird, treasurer; A. F. Stillman, secretary and works manager, and Carl Wigtel, chief engineer.

F. M. Gilmore, Chicago, Ill., who was formerly with the railroad department of the H. W. Johns-Manville Company, New York, N. Y., has become connected with the Chicago Car Heating Company, with headquarters in the Railway Exchange Building, Chicago, Ill.

Wonham, Sanger & Bates, New York, N. Y., have received an order for 4-B life guards for the 500 new "near-side" cars being built for the Philadelphia Rapid Transit Company by The J. G. Brill Company. They will also furnish C. H. meters for installation on all cars of the Delhi Tramways.

Railway Steel Spring Company, Chicago, Ill., has appointed F. J. Foley, for some years the manager of sales for that concern in the Eastern territory, to the position of general superintendent, with headquarters at 30 Church Street, New York, N. Y. Mr. Foley will be succeeded by D. W. Anderson, who has been identified with the Railway Steel Spring Company's interests in Pittsburgh for many years.

Wisconsin Engine Company, Corliss, Wis., is developing a crude-oil gas producer invented by Arthur Grine, of California, for which strong claims are made as to low cost and high efficiency. The producer is adapted to the use of the lowest grades of oil, and can be made in capacities, it is claimed, as high as 10,000 hp. Edward T. Adams, formerly chief engineer of the Allis-Chalmers Company, is now president of the Wisconsin Engine Company.

C. G. Young, New York, N. Y., engineer and contractor, has been engaged as consulting engineer to design and supervise the construction of the electric tramway in Panama City, Republic of Panama, with extensions in the Canal Zone. Mr. Young made the examination and report last year upon the basis of which the tramways are to be built. The contract has already been given out for the local construction work. The system will comprise about 10½ miles of track and about fifteen motor cars will be used.

Bethlehem Steel Company, South Bethlehem, Pa., announces the following changes in its organization: C. F. Hockley, for the last three years engineer of the power department of the company, has been appointed superintendent of the construction power department with headquarters at South Bethlehem. Mr. Hockley prior to his present association was identified with the Westinghouse Machine Company. B. A. Brennan recently contract manager of the Westinghouse Machine Company and formerly with E. P. Allis Company, has been appointed sales manager of the power department of the company with headquarters at South Bethlehem, in charge of gas engine and pumping engine sales.

H. W. Johns-Manville Company, New York, N. Y., has acquired a tract of over 200 acres at Finderne, N. J., upon which it will erect a general Eastern factory. The output of this factory, as stated in the Electric Railway Journal of Dec. 23, 1911, will be sufficient to meet the entire demand for the company's products from this part of the country. The company will shortly move its executive office from 100 William Street, New York, to its new building at Madison Avenue and Forty-first Street, New York. The company has appointed W. H. Lawrence manager of the waterproofing and mastic department with office in Chicago, Ill. Mr. Lawrence will supervise all the waterproofing work of the company throughout the country.

ADVERTISING LITERATURE

Indianapolis Brass Company, Indianapolis, Ind., is mailing a card to the trade which calls attention to the merits of I. B. C. frogs.

Electric Service Supplies Company, Philadelphia, Pa., has issued a booklet in which the Keystone truss pin is described and illustrated.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued list No. 127 for January, 1912, of second-hand rails, locomotives, cars, equipment and contractors' supplies which the company has on hand for immediate shipment.

Best Manufacturing Company, Pittsburgh, Pa., has issued Catalog No. 103, which lists and illustrates a complete line of piping materials for steam, air and hydraulic high-pressure piping systems, including valves, fittings, flanges, pipe and pipe bends, separators, etc. The catalog contains the new universal lists for iron-body gate valves as adopted by the manufacturers in November, 1911.

The J. G. Brill Company, Philadelphia, Pa., has printed in the *Brill Magazine* for January, 1912, a biographical sketch of H. E. Chubbuck, vice-president executive and general manager of the Illinois Traction System and the Western Railways & Light Company. A portrait of Mr. Chubbuck accompanies the sketch. Vienna, Austria, is the subject of the thirty-seventh article of the series describing conditions which govern the type of car for city service. Some of the more recent trailer cars in Vienna are arranged for prepayment operation. Other articles describe new rolling stock which the company has built recently for operation in Utica, N. Y.; Akron, Ohio; Shreveport, La.; Denton, Tex.; Easton, Pa., and on the Lookout Mountain Incline Railway. The method of calculating foundation brake rigging is also described.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4901, which is devoted to alternating-current switchboard panels with oil switches attached, and designed for three-phase, three-wire circuits 240, 480 and 600 volts, 25-60 cycles. Bulletin No. 4904 illustrates and describes three-phase panels for use in small or isolated plants containing but one generator. These panels are not intended for the parallel operation of generators, but for installation in a switchboard consisting of two or more panels. Bulletin No. 4905 is devoted to panels designed for general use in small central stations and isolated plants. They are for use with one set of busbars, to which the generators and feeders are connected, and are suited to the parallel operation of generators. Bulletin No. 4893 describes two automatic time switches manufactured by the company. Bulletin No. 4917 illustrates and describes the company's direct-current exciter panels, which are for use in connection with alternating-current generator panels when for any reason separate control of exciters is desired.

NEW PUBLICATIONS

Association Proceedings. Published by the American Electric Railway Association. New York, 1912.

The proceedings of the American Electric Railway Association and of its four affiliated associations, the Accountants' Association, the Engineering Association, the Claim Agents' Association, and the Transportation & Traffic Association, as usual appeared promptly and in time for use at the mid-year conference of the association in New York last week. As is customary, the report is printed in three volumes. The number of pages this year is about 2700, which is an increase of about 30 per cent over the 1910 report and an increase of about 50 per cent over the 1900 report. The student of electric railway operation will find in these volumes a verbatim report of the proceedings at the 1911 convention, at which great progress was made in the different branches of electric-railway service.

Electric Railway Engineering. By C. Francis Harding, professor of electrical engineering, Purdue University. New York, 1911; McGraw-Hill Book Company. Cloth, 336 pages. Price, $3.

This book has been written primarily as a textbook for students in electrical engineering who are specializing in railway work. It is essentially a summary in convenient form of present-day theory and practice of electric railway engineering. With such a wide scope it has not been possible, of course, to devote much space to the details of standard equipment. The construction and use of speed-time curves has been elaborated rather more fully than any other phase of the subject. Among other chapters are the following: "Substation Location and Design," "Transmission Systems," "Bonds and Bonding," "Signal and Dispatching Systems," "Rolling Stock," "Motors and Control Apparatus," "Electric Locomotives and Electric Traction on Trunk Lines." The volume is illustrated with 138 engravings.